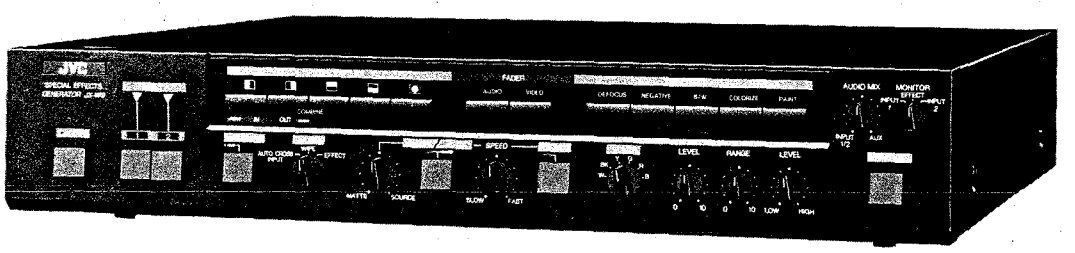
JVC

SERVICE MANUAL

SPECIAL EFFECTS GENERATOR

MODEL JX-W9 (E), (EB), (EK)

PAL



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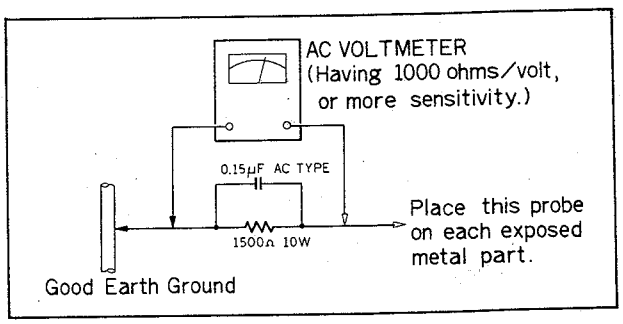
No. 70053
JUN. 1987

Safety Precautions

1. The design of this product contains special hardware and many circuits and components specially for safety purposes.
   For continued protection, no changes should be made to the original design unless authorized in writing by the manufacturer. Replacement parts must be identical to those used in the original circuits. Service should be performed by qualified personnel only.
2. Alterations of the design or circuitry of the product should not be made. Any design alterations or additions will void the manufacturer's warranty and will further relieve the manufacturer of responsibility for personal injury or property damage resulting therefrom.
3. Many electrical and mechanical parts in the product have special safety-related characteristics. These characteristics are often not evident from visual inspection nor can the protection afforded by them necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in the parts list of the service manual. Electrical components having such features are identified by shading on the schematics and by (⚠) on the parts list in the service manual. The use of a substitute replacement which does not have the same safety characteristics as the recommended replacement part shown in the parts list in the service manual may create shock, fire, or other hazards.
4. The leads in the products are routed and dressed with ties, clamps, tubings, barriers and the like to be separated from live parts, high temperature parts, moving parts and/or sharp edges for the prevention of electric shock and fire hazard.
   When service is required, the original lead routing and dress should be observed, and it should be confirmed that they have been returned to normal, after re-assembling.
5. Leakage current check
   (Electrical shock hazard testing)
   After re-assembling the product, always perform an isolation check on the exposed metal parts of the product (antenna terminals, knobs, metal cabinet, screw heads, headphone jack, control shafts, etc.) to be sure the product is safe to operate without danger of electrical shock.
   Do not use a line isolation transformer during this check.
   - Plug the AC line cord directly into the AC outlet. Using a "Leakage Current Tester", measure the leakage current from each exposed metal part of the cabinet, particularly any exposed metal part having a return path to the chassis, to a known good earth ground. Any leakage current must not exceed 0.5 mA AC (r.m.s.).
   - Alternate check method
     Plug the AC line cord directly into the AC outlet. Use an AC voltmeter having 1,000 ohms per volt or more sensitivity in the following manner. Connect a 1500 Ω 10 W resistor paralleled by a 0.15 μF AC-type capacitor between an exposed metal part and a known good earth ground.
     Measure the AC voltage across the resistor with the AC voltmeter.
     Move the resistor connection to each exposed metal part, particularly any exposed metal part having a return path to the chassis, and measure the AC voltage across the resistor. Now, reverse the plug in the AC outlet and repeat each measurement. Any voltage measured must not exceed 0.75 V AC (r.m.s.). This corresponds to 0.5 mA AC (r.m.s.).


AC VOLTMETER
(Having 1000 ohms/volt, or more sensitivity.)
0.15μF AC TYPE
1500Ω 10W
Place this probe on each exposed metal part.
Good Earth Ground

1. Features

- Source input picture can be wiped in and out using one of 16 wipe patterns with 6 different matte background colors.
- Video and audio can be faded in or out simultaneously or independently; fade-to-black and fade-to-white are both possible.
- Wiping and fading can be performed manually or automatically; each operation variable between 1 and 6 seconds.
- Wiping and fading can be used together or separately.
- Special image effects (colorization, painting, black and white, negative and defocus) can be used to enhance the picture.
- After processing, the picture can be wiped with the source input (non-processed picture).
- Two input sources can be changed over automatically using the wiping or fading function (AUTO CROSS INPUT).
- Two pairs of input terminals are provided, with source monitor output terminals for direct monitoring.
- Monitor selector switch is provided to monitor the source picture and the processed picture on a single monitor TV.
- Auxiliary audio input terminals and Audio Mix knob allow mixing with external sound sources.
- Wipe Reverse switch for replacing the input source picture with the matte background color or processed picture.
- Bypass switch is provided for comparing the processed picture with the original image.

2. Specifications

Video section

Signal format	: PAL
Input terminals	: BNC, 2 lines (INPUT 1/2)
Input impedance	: 75 ohms, unbalanced
Output terminals	: BNC, 2 lines (REC OUT, EFFECT MONITOR)
Output impedance	: 75 ohms, unbalanced
Input monitor terminals	: BNC (INPUT 1/2)
Output impedance	: 75 ohms, unbalanced
Reference input level	: 1 Vp-p
Max. allowable input	: 1.5 Vp-p
Reference output level	: 1 Vp-p (1 Vp-p input, 75-ohm loaded)
Signal-to-noise ratio	: 48 dB or more
Crosstalk	: 48 dB or more (4.43 MHz)
Wipe duration	: Approx. 1 to 6 seconds

Audio section

Input terminals	: RCA pin jacks, 2 lines (INPUT 1/2, stereo)
Input impedance	: 47 kohms
AUX input terminals	: RCA pin jacks, 1 line (stereo)
Input impedance	: 10 kohms
Output terminals	: RCA pin jacks, 2 lines (REC OUT, EFFECT MONITOR, stereo)
Output impedance	: 1 kohm
Input monitor terminals	: RCA pin jacks, 2 lines (INPUT, 1/2, stereo)
Output impedance	: 1 kohm
Reference input level	: -10 dBV (316 mV: 1 kHz)
Reference output level	: -10 dBV ±2 dB (316 mV ±2 dB: at reference level input)
Max. allowable input	: +6 dBV (2 V: 1 kHz, 1 % distortion)
Frequency response	: 20 – 20,000 Hz (-1 ±2 dB/1 kHz, 0 dB)
Signal-to-noise ratio	: 80 dB
Crosstalk	: 70 dB (1 kHz)
Distortion rate	: 0.1 % or less (-10 dBV, 1 kHz)

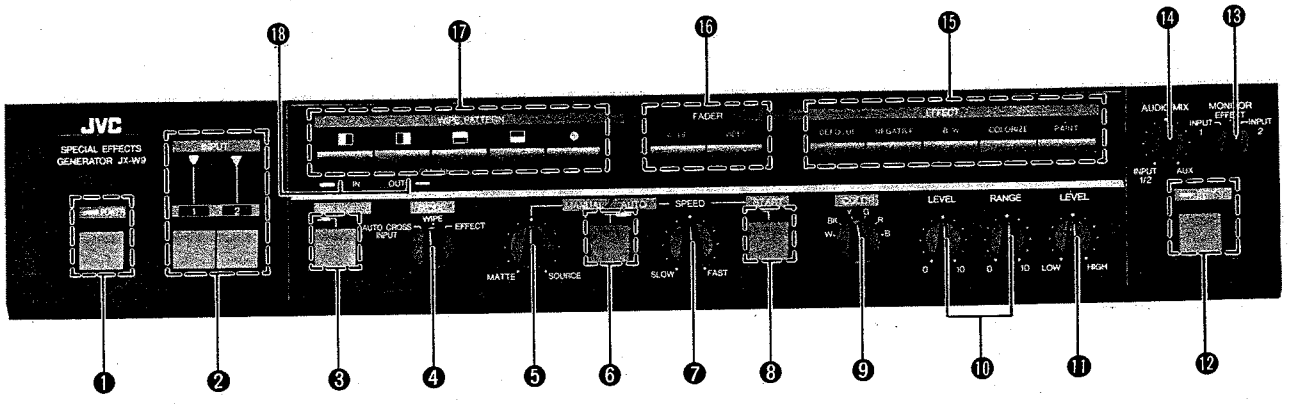
General

Power supply	: AC 220 V∿, 50 Hz (E), (EB) AC 240 V∿, 50 Hz (EK)
Power consumption	: 19 watts (Power on) 2 watts (Power off) } (E), (EB) 20 watts (Power on) 2 watts (Power off) } (EK)
Dimensions	: 435(W) x 82(H) x 367(D) mm (including knobs, jacks and feet) (17-3/16" x 3-1/4" x 14-1/2")
Weight	: 5.1 kg (11.1 lbs)

Design and specifications subject to change without notice.

3. Names of Parts and Their Functions

Front Panel



❶ **POWER switch and indicator**
Press to turn the power on; the indicator lights. Pressing it again turns the power off.

❷ **INPUT select switches and indicators**
Press to select the input source, VCR-1 or VCR-2; the selected Input indicator lights.

❸ **WIPE REVERSE switch and indicator**
When wiping, press to replace the input source picture with the background picture*; when this switch is pressed to on, its indicator lights.

❹ **MODE select knob**
Select the desired operation, (AUTO CROSS INPUT, WIPE or EFFECT), with this knob.

❺ **MANUAL control knob**
Used to perform wiping or fading manually. Turning counterclockwise increases the background color, and turning clockwise increases the input source picture.

❻ **MANUAL/AUTO select switch and indicators**
Press this switch to select either automatic or manual wiping/fading. The selected mode indicator lights.

❼ **SPEED control knob**
Adjust the automatic wiping/fading speed with this knob. Turning it clockwise increases the speed, and turning counterclockwise decreases it. (The wiping/fading speed can be varied between 1 and 6 seconds.)

❽ **START switch and indicator**
Press to start wiping or fading automatically. The indicator blinks when the switch is pressed, and goes off when the operation is finished.

❾ **COLOR select knob**
Select the background color with this when wiping (6 colors — white, black, yellow, green, red or blue), coloring (4 colors — yellow, green, red or blue), and fading (black or white).

❿ **COLORIZE control knobs**
LEVEL: Adjusts the color intensity (brightness) of the section to be colorized.
RANGE: Adjusts the range of colorizing section.

⓫ **PAINT LEVEL control knob**
Adjusts the color brightness of any area being painted.

⓬ **BYPASS switch and indicator**
Press to deactivate all effects (including wipe or fade) so that the input source signal is sent directly to the output terminal; the indicator lights.

⓭ **MONITOR select knob**
Select the signal to be output to the monitor TV for checking or monitoring one of the input source pictures, or the processed picture. (N.B.: Monitor TV must be connected to the EFFECT MONITOR output terminals.)

⓮ **AUDIO MIX knob**
Balances the sound from the input source with the sound from external audio source equipment connected to the AUX input terminals on the rear panel.

⓯ **EFFECT select switches**
To select the desired effect from DEFOCUS, NEGATIVE, B/W, COLORIZE and PAINT.

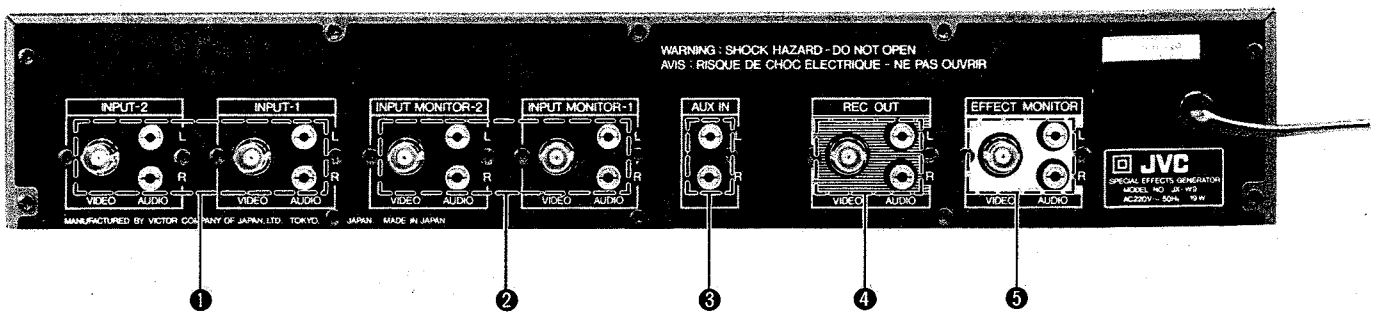
⓰ **FADER select switches**
To select the fading source with the AUDIO only switch, the VIDEO only switch, or both.

⓱ **WIPE PATTERN select switches**
Select from among 5 different wiping patterns with these switches. Except for the circle, the other 4 patterns can be used in any combination.

⓲ **Source status indicator (IN/OUT)**
The IN indicator lights when the input source picture is in the "in" position on the screen. The OUT indicator lights when the input source picture is in the "out" position and the background picture* is in the "in" position.

*This shows the picture without a source input picture, that is, the matte background color, fade-out picture, or processed picture.

Rear Panel



❶ **INPUT terminals (VCR-1/VCR-2)**
Connect the playback VCRs, etc. to these terminals. The upper terminals correspond to the INPUT-1 button on the front panel, and the lower terminals to the INPUT-2 button.

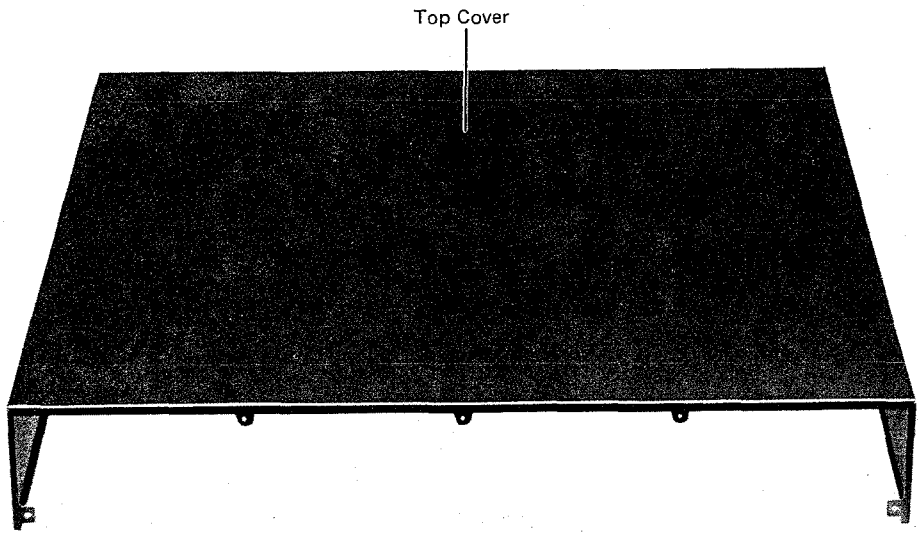
❷ **INPUT MONITOR output terminals (VCR-1/VCR-2)**
These terminals are used to monitor the input source from the INPUT terminals directly. The upper terminals are for INPUT-1 source, and the lower terminals for INPUT-2 source.

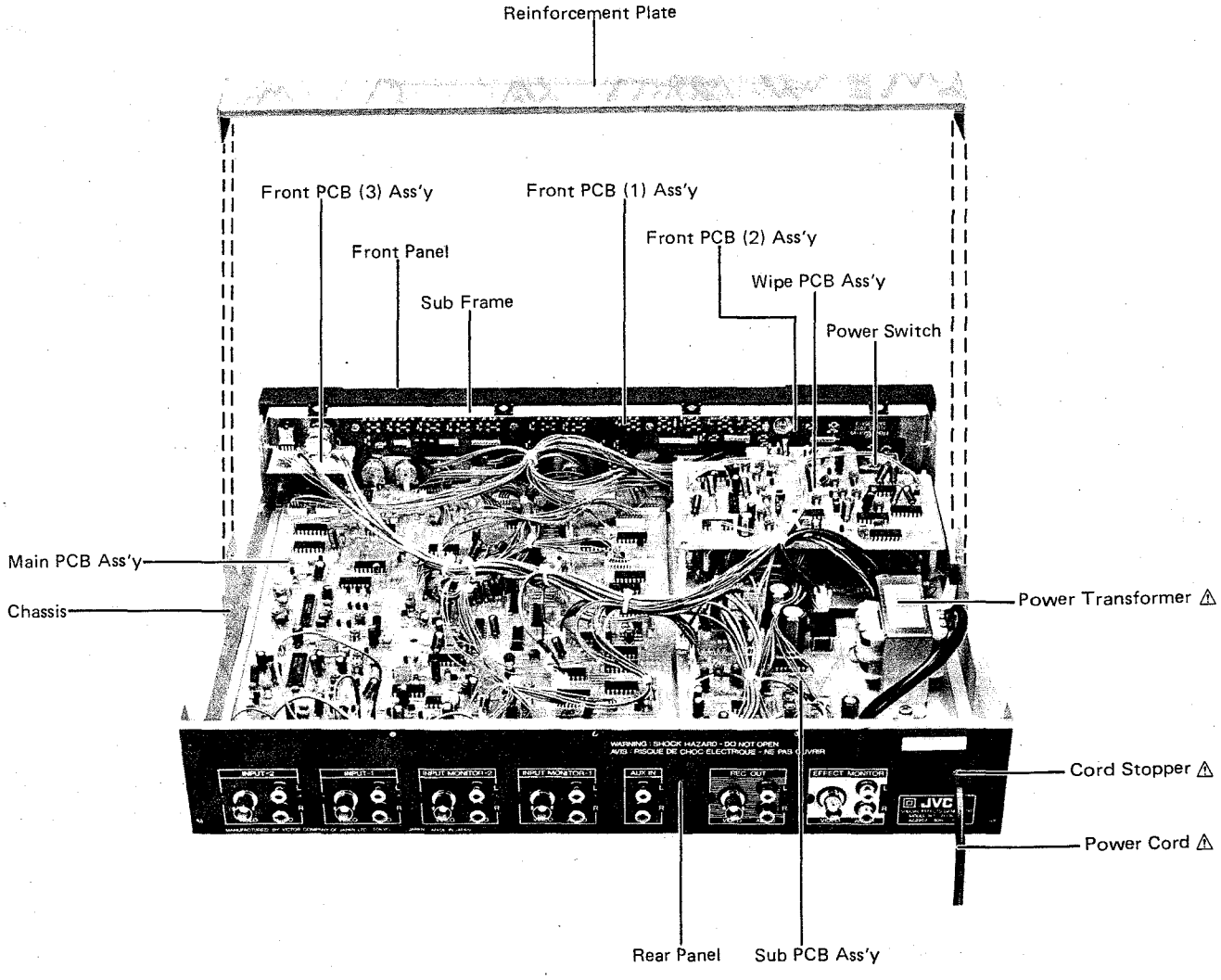
❸ **AUX IN terminals**
Connect external audio equipment to these terminals, for mixing or replacing the audio signal of the input sources with the outboard audio source.

❹ **REC OUT terminals**
Connect the recording VCR to these terminals.

❺ **EFFECT MONITOR output terminals**
Connect the monitor TV to these terminals. When the MONITOR OUT selector is set to EFFECT, the effected picture can be monitored, and when the INPUT 1 or 2 is selected, the input source picture can be monitored directly.

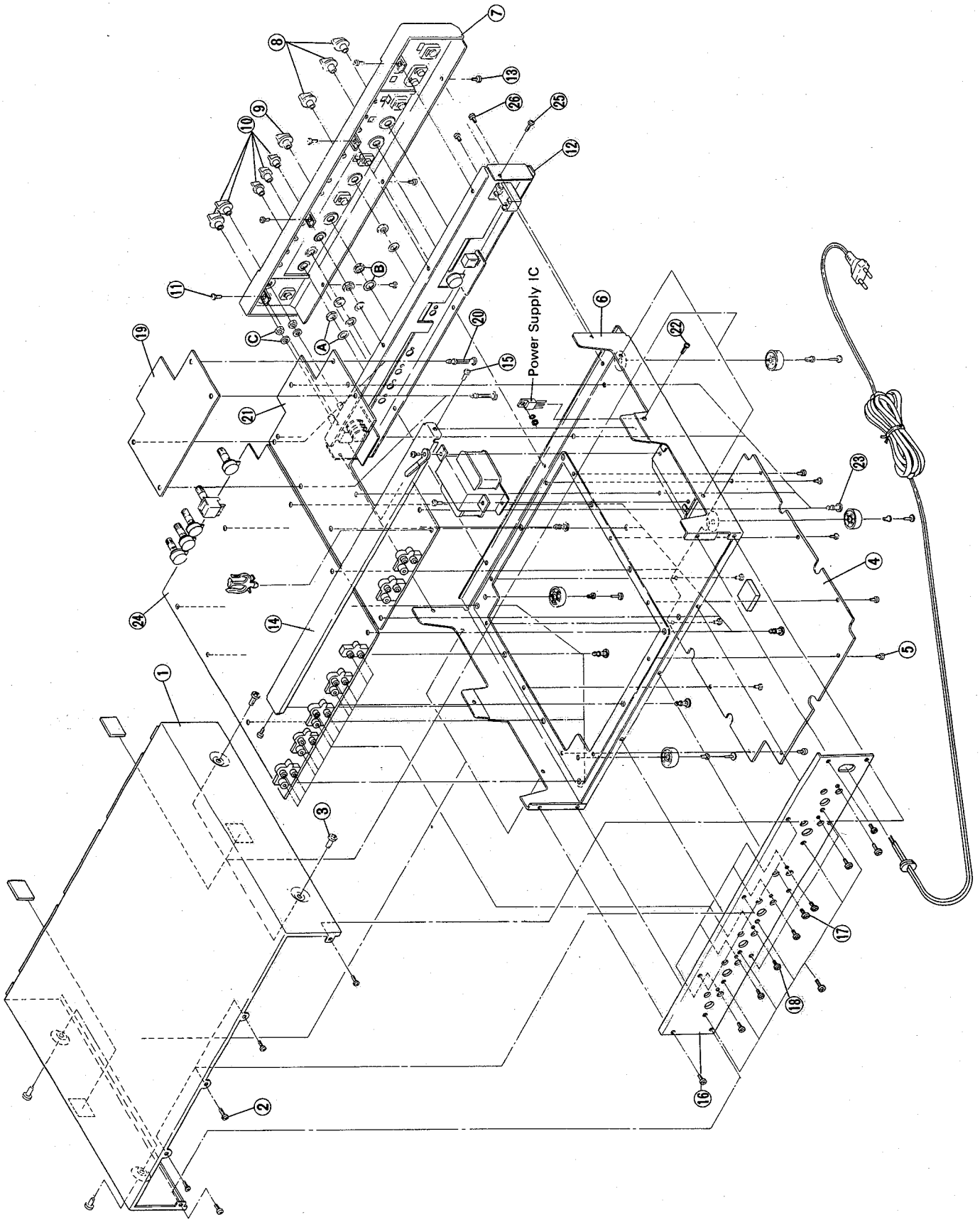
4. Main Parts Locations





⚠ : Safety Parts

5. Disassembly



Note:
For connector locations, refer to page 30.

Removing the Top Cover ①
1. Remove five screws ② on the rear panel retaining the top cover, and four screws ③ on the side.
2. Remove the top cover by pulling it backward.

Removing the Bottom Cover ④
1. Remove ten screws ⑤ attaching the bottom cover to chassis ⑥, to remove the bottom cover.

Removing the Front Panel Ass'y ⑦
1. Remove the top cover according to the above procedure.
2. Pull out the three knobs A ⑧, knob C ⑨ and five knobs B ⑩ toward you.
3. Remove four screws ⑪ attaching the upper section of the front panel to the sub frame ⑫.
4. Remove three screws ⑬ attaching the lower section of the front panel to the sub frame.
5. Pull out the front panel forward to remove it.

Removing the Reinforcement Plate ⑭
1. Remove the top cover according the above procedure.
2. Remove two screws ⑮ on both ends of the reinforcement plate and pull it upward.

Removing the Rear Panel ⑯
1. After removing the top cover ①, remove five screws ⑰ retaining the rear panel and chassis.
2. Remove thirteen screws ⑱ retaining the pin jacks and BNC jacks on the rear panel.
3. Pull out the rear panel toward you.

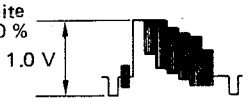
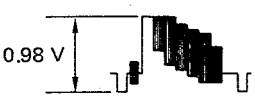
Removing the Wipe PCB Ass'y ⑲
1. Remove the top cover ①, reinforcement plate ⑭ and rear panel ⑯ according the above procedures.
2. Hold the upper ends of four holders B ⑳ at the corners of the Wipe PCB with pliers to unlock it, and lift it up to remove it.

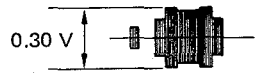
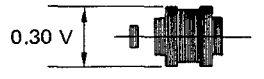
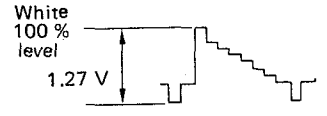
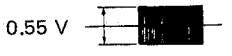
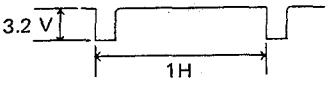
Removing the Sub PCB Ass'y ㉑
1. Remove the Wipe PCB ass'y ⑲ according to the above procedure.
2. Remove the screw ㉒ and then remove the power supply IC.
3. Remove the connectors CN40 and 45.
4. Remove the two screws ㉖ and remove the power switch.
5. Remove the wire from the wire clamper.
6. Hold the upper ends of the eight holders A ㉓ with pliers to unlock it, and lift it up to remove it.

Removing the Sub Frame Ass'y ⑫ and Main PCB Ass'y ㉔
1. Remove the top cover ①, front panel ass'y ⑦, rear panel ⑯, reinforcement plate ⑭, sub PCB ass'y ㉑, and Wipe PCB ass'y ⑲ according to the above procedures.
2. Remove the washers and nuts Ⓒ of the AUDIO MIX knob and MONITOR select knob, and remove the front PCB (3) ass'y from the sub frame.
3. Remove two screws ㉕ retaining the both sides of the sub frame and chassis ⑥.
4. Hold the upper ends of the ten holders retaining the main PCB with pliers to unlock it, then lift up the PCB and remove the sub frame ass'y ⑫ and main PCB ass'y ㉔ from chassis without separating them.
5. Remove washers and nuts Ⓐ Ⓑ for five knobs and two switches from the sub frame, and remove the sub frame ass'y from the main PCB ass'y.

6. Troubleshooting

Notes: 1. Input signal:
Video: Full-field color bar (white 100 %), 1.0 Vp-p
Audio: 1 kHz, -10 dBV sine wave
2. NO: When normal voltage and waveforms are not present
YES: Normal voltages, etc.
3. Refer to the "ICs and Adjusting Points Locations" on page 29.
4. Before starting repairs, check each adjustment related to the timing pulse in "Adjustment Procedure" (on page 19.)
5. For adjustment, refer to the "Adjustment Procedures".

Symptom	Check point		Normal voltage and waveforms	Adjusting point and defect
1. No picture nor sound.	①	Secondary side of power transformer	AC 15.0 V	NO: • Power cord or power transformer is shorted. • Power switch or power transformer connector, etc. is defective. YES: • Check ②.
	②	C232	DC 12.0 V (11.5 – 12.5 V) Power supply of main circuit	NO: • IC17 or D20 is defective. • Lead wire or connector, etc. of IC17 is defective. YES: • Check ③.
	③	Power line of each section	DC 11.5 – 12.5 V	
2. No output is present at any output terminals.	④	Hot sides of R1, R8 (75 ohms)	White 100 % 1.0 V 	NO: • Video input terminals are defective. Check the voltage and waveforms in the vicinity of Q1 or Q2.
3. No output is present at video jacks of MONITOR and REC OUT terminals. Or their levels are abnormal. (With BYPASS on and off)	⑤	Check IN/OUT of IC27. IN → OUT Gate pin 1 pin 2 pin 13 pin 4 pin 3 pin 5	Same waveform as above. Input-1 ON: pin 13 goes H Input-2 ON: pin 5 goes H IC27 IC70 pin 13 → pin 12 pin 5 → pin 13 (Connected to CN25)	NO: • IC27 is defective. • Connector CN25-1, CN25-2 and lead wires are defective. (Refer to "Switching Truth Table".) YES: • Check ⑥.
	⑥	IC16 pin 1 (AN608)	2.0 V Adjust VR35.	NO: • Check IC11 input pins (pins 11, 10), output pins (pins 1, 2) and gate pins (pins 12, 13). • Check each voltage and waveform at Q65, IC16, Q66 and Q67. • Check IC12 input pin (pin 10), output pin (pin 11) and gate pin (pin 12).
4. No output is present at video jacks on MONITOR and REC OUT terminals. Or their levels are abnormal. (Only when BYPASS off)	⑦	Emitter of Q55	0.82 V 	NO: • Check Q13. • Connector CN17-1 or lead wire is defective. • Check the voltage waveform of Q55. YES: • Check ⑧.
	⑧	Emitter of Q62	0.98 V  Adjust VR33	NO: • Check each voltage and waveform of Q62, IC15. • Check IC9 in/out pins 1, 2 and gate pin 13. YES: • Check ⑨.
	⑨	Base of Q65	Same waveform as ⑧ when BYPASS is set to OFF. IC11 pins 1, 2 → same as ⑧. pin 13 → H IC11 IC34 pin 13 → pin 1 (Connected to CN29)	NO: • IC11, IC10 is defective. • Connector CN29-2 is defective, or check peripheral components, etc. YES: • Check Q65, C138 and its peripheral components, etc.

Symptom		Check point	Normal voltage and waveforms	Adjusting point and defect
	⑩	IC9 IN OUT Gate pin 2 pin 1 pin 13 pin 10 pin 11 pin 12	• When Wipe Manual knob is set to SOURCE, gate pin 13 is H. • When Wipe Manual knob is set to MATTE, gate pin 12 is H.	NO: • Check the "Wipe Gate Logic Diagram". YES: • IC9 is defective.
5. When wipe operation is set to Source side (IN), chroma output is not present, or level is abnormal.	⑪	IC30 pin 5		NO: • Check of BPF1. • Check voltages of Q5. YES: • Check ⑫.
	⑫	IC30 pin 3	 Adjust VR3	NO: • C98 is misadjusted. • IC30 pin 26 HD PULSE is defective. • IC28 is defective. YES: • Check ⑬.
	⑬	Emitter of Q13	 Adjust VR2 (chroma)	NO: • Check the vicinity of Q83, Q11, Q13. YES: • Check connector CN17-1, lead wire, Q55, Q56. • Check clamp circuit consisting of IC9 in/out pins 3, 4 and gate pin 5.
6. When wipe operation is set to Source (IN) side, luminance level is abnormal.	⑭	Emitter of Q8		NO: • Check of DL-1 • Check voltage and waveforms in the vicinity of Q6, Q7, Q8. YES: • Check ⑮.
	⑮	Emitter of Q13	Same as ⑬.	NO: • Check voltage and waveform of Q13. YES: • Check connector CN17 and lead wires. Check Q55, Q56.
7. Background (matte) color is not present, or level is abnormal.	⑯	IC28 Pin 5, 20	 4.43 MHz SC Input	NO: • Check IC30 Pin 19, 22. YES: • Check ⑰.
Mode: Wipe Color: Y ~ B Wipe Operation Knob: Matte *For abnormal hue refer to item 11 and 12.	⑰	IC31 Pin 8 (G) Pin 4 (R) Pin 2 (B)	 Outputs at each pin of S19 (Color SW) Pin 8 / Pin 4 / Pin 2 W: ○ ○ ○ BK: – – – YL: ○ ○ – G: ○ – – R: – ○ – B: – – ○ *The above waveform is present at the points marked 0.	NO: • Check Q10. • Check D1, D2, D203, D204. • Check S19 (COLOR SW). YES: • Check ⑱.

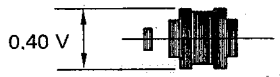
<table>
<tr><th>Symptom</th><th colspan="2">Check point</th><th>Normal voltage and waveforms</th><th>Adjusting point and defect</th></tr>
<tr><td rowspan="3"></td><td>⑱</td><td>IC28 Pin 1 (B-Y)
Pin 24 (R-Y)</td><td>Polarity (+)

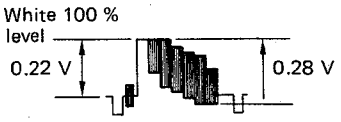
Polarity (-)

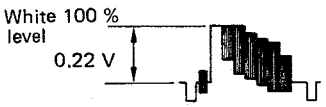
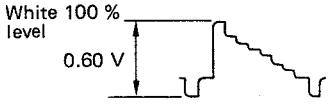
Outputs at each pin of S19 (Color SW) (Voltage "a")
<table><tr><th></th><th>Pin 1</th><th>Pin 24</th></tr><tr><td>W</td><td>○</td><td>○</td></tr><tr><td>BK</td><td>○</td><td>○</td></tr><tr><td>YL</td><td>(-) 360 mV</td><td>(+) 110 mV</td></tr><tr><td>G</td><td>(-) 250 mV</td><td>(-) 470 mV</td></tr><tr><td>R</td><td>(-) 130 mV</td><td>(+) 600 mV</td></tr><tr><td>B</td><td>(+) 390 mV</td><td>(-) 100 mV</td></tr></table></td><td>NO: • Check Q80 ~ Q82.
• Check Voltage and waveforms in the vicinity of Q15 ~ Q21.
• V10 is incorrectly adjusted.
YES: • Check ⑲.</td></tr>
<tr><td>⑲</td><td>C39
(IC41 Pin 1)</td><td>

Levels at each pin of S19 (Color SW). (Voltage "a")
<table><tr><th></th><th>a (mV)</th><th></th><th>a (mV)</th></tr><tr><td>W</td><td>8.5</td><td>G</td><td>460</td></tr><tr><td>BK</td><td>7</td><td>R</td><td>480</td></tr><tr><td>YL</td><td>370</td><td>B</td><td>370</td></tr></table></td><td>NO: • Check voltages and waveforms at each pin of IC28.
• Carrier balance (VR6, VR8) is incorrectly adjusted.
• Check voltages and waveforms in the vicinity of Q25.
Check item 10~ 13 in "Adjustment Procedures".
YES: • Check ⑳.</td></tr>
<tr><td>⑳</td><td>Emitter of Q35</td><td>

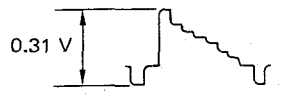
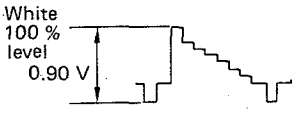
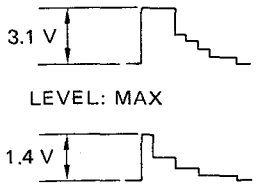
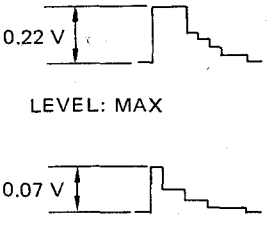
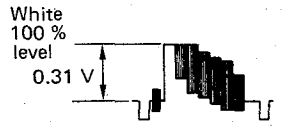
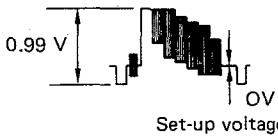
Color:Blue</td><td>NO: • Check IC41 pin 13 and gate no. 37 according to "Switching truth table".
• Check Q22, Q35 and Q34.
• Check IC53 pin 12 and gate no. 40 according to "Switching truth table".</td></tr>
<tr><td>8. Chroma level of Effect side is abnormal. (Source side is normal.)

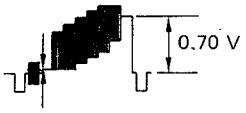
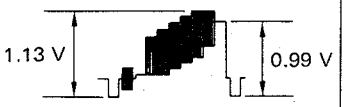
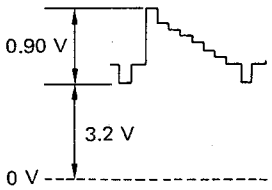
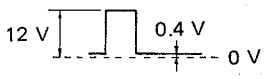
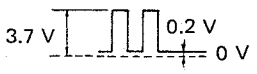
Mode: Effect
Color: Y ~ B
Effect mode: Colorize
Wipe operation: Matte</td><td>㉑</td><td>Emitter of Q14</td><td> 

Adjust VR13</td><td>NO: • Check voltage and waveform of Q19, Q81.
• Re-check VR3 in ⑫.
YES: • Check ㉒.</td></tr>
<tr><td></td><td>㉒</td><td>Emitter of Q35</td><td> 
</td><td>NO: • Check voltage and waveform of Q22, Q35.
• Check voltage and waveform of IC41 in/out pins 9 and 8.
Check gate no. 36, with the "Switching Truth Table".
YES: • Check the clamp circuit with IC42 gate pin 5, input/output pins 3, 4.
• Check voltages and waveforms of Q60, Q61.
• Check connector CN12-1 and lead wires.</td></tr>
<tr><td>9. Luminance level of Effect side is abnormal. (Source signal is normal.)

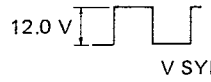
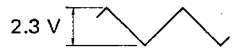
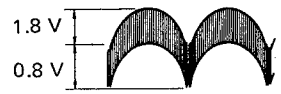
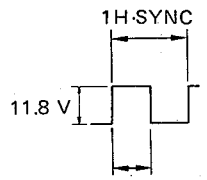
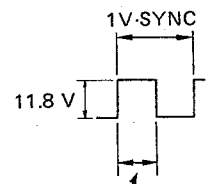
Mode: Effect
Color: Y ~ B
Wipe operation: Matte</td><td>㉓</td><td>In COLORIZE
Emitter of Q35</td><td> 
</td><td>NO: • With the "Switching Truth Table", check gate 39.
• Check the vicinity of Q34.
YES: • Check ㉚.</td></tr>
<tr><td></td><td>㉔</td><td>In DEFOCUS
Emitter of Q31</td><td> 

Adjust VR15.</td><td>NO: • Check voltages and waveforms in the vicinity of Q18, Q31.
YES: • Check ㉕.</td></tr>
</table>

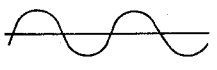
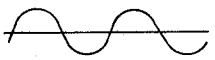
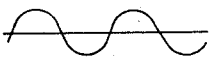
Symptom		Check point	Normal voltage and waveforms	Adjusting point and defect
	㉕	Emitter of Q35	 * Set the Color to W or BK.	NO: • Check the voltages and waveforms of Q34, IC53 input/output pins 2, 1. • With the "Switching Truth Table", check gate 41 (pin 13). YES: • Check ㉚.
	㉖	In PAINT Emitter of Q32		NO: • Check voltages and waveforms of all sections of Q26 ~ 29. • Check clamp circuit with IC48 input/output pins 4, 3, and gate pin 5. YES: • Check ㉗.
	㉗	Emitter of Q35		NO: • Readjust VR23. Set IC39 pin 13 to 3.5 V. Incorrectly adjusted → Check ㉘. Check the output of Q32, IC39 pins 6, 5, and 4. YES: • Check ㉙.
	㉘	IC39 pin 13 pin 11	Pin 13: DC 3.5 V Pin 11: DC 5.1 V (low) ~ 4.1 V (high)	NO: • Check input/output voltages of 3-pin regulator IC18. • Check voltages and waveforms of all sections of IC36, Q30. LEVEL control knob VR22 is defective.
	㉙	TP6	 Adjust VR24. * Set the COLOR to W or BK.	NO: • Check voltages and waveforms of all sections of Q33 ~ 35. • Check voltages and waveforms of IC53 in/out pins 9, 8. With the "Switching Truth Table", check gate No. 42 (pin 6). YES: • Check ㉚.
10. Negative/ positive operation is incorrect. Mode: Effect Color: Y ~ B Wipe Operation: Matte (Source signal is normal.)	㉚	When NEGATIVE is OFF, Emitter of Q60 COLORIZE ON for Effect.	 Adjust VR16 ~ 19	NO: • Check all voltages and waveforms of IC72, Q36, Q37. • Check the clamp circuit consisting of IC42 in/out pins 3, 4 and gate pin 5. • Check the voltage at IC42 in/out pins 10 and 11. • According to the "Switching Truth Table", check gate No. 45 (pin 12). YES: • Check ㉛.
	㉛	Emitter of Q62	 Adjust set-up voltage with VR30.	NO: • Check clamp circuit consisting of IC9 in/out pins 8, 9 and gate pin 6. • Check all voltages and waveforms of Q59, 61. Check voltages and waveforms of IC9 in/out pins 10 and 11, and check gate no. 47 (pin 12) according to "Switching Truth Table".

Symptom	Check point		Normal voltage and waveforms	Adjusting point and defect
	㉜	When NEGATIVE ON, Emitter of Q60	 Set-up voltage OV Adjust VR16 ~ 19.	NO: • Check all voltages and waveforms of IC72, Q36 and 37. • Check clamp circuit consisting of IC42 in/out pins 3, 4 and gate pin 5. • Check voltages of IC42 in/out pins 1, 2, and check gate No. 44 (pin 13) according to "Switching Truth Table". YES: • Check ㉝.
	㉝	Emitter of Q62		NO: • Same as ㉛.
11. Level, phase of background color is incorrectly ad-adjusted.	㉞	Video terminal of REC OUT	YL: 167° G: 241° R: 104° B: 347° Measure with vectorscope.	NO: • Re-adjust the following according to item in "Adjustment Procedures" (on page 21): (10~13) VR5 — Phase of background color VR6, 8 — Carrier balance VR7 — Set-up VR9 — R-Y level VR11 — Level of background color • Check item 7.
12. Colorization operation is abnormal.	㉟	IC37 pin 10 pin 4 (μPC 319 C)		NO: • Check voltages and waveforms of Q26 ~ 29. • Check clamp circuit consisting of IC48 in/out pins 3, 4 and gate pin 5. YES: • Check that the IC37 pins 9, 5 are varied with the LEVEL and RANGE knobs. (Variable 3.4 V ~ 5.0 V) • Check ㊱.
	㊱	IC37 pin 7 pin 12 (μPC319 C)	 Variable by controlling LEVEL and RANGE VRs	NO: • Check voltages and waveforms in the vicinity of IC37. YES: • Check gate No. 36 according to "Switching Truth Table".
13. Painting operation is abnormal Mode: Effect Effect: Paint	㊲	IC39 pin 7 (MB40576)	 17.73447 MHz	NO: • Check voltages and waveforms in the vicinity of IC38. • IC38, crystal oscillator X-2 is defective. YES: • Check ㊳.
	㊳	IC39 pins 3, 4, 5	 Variable by controlling the LEVEL VR.	NO: • Check voltages and waveforms in the vicinity of IC39. Check ㉖ and ㉘. YES: • Check ㉗.
14. B/W operation is abnormal Mode: Effect Effect: B/W	㊴	IC41 pin 5	ON: 11.5 V OFF: 0.4 V	NO: • According to the "Switching Truth Table", Check No. 38 gate. YES: • Check IC41 in/out pins 3 and 4.
15. DEFOCUS operation is abnormal Mode: Effect Effect: Defocus	㊵	IC53 pin 13	ON: 11.5 V OFF: 0.4 V	NO: • According to "Switching Truth Table", check gate No. 41. YES: • Check ㉔.

Symptom	Check point		Normal voltage and waveforms	Adjusting point and defect
16. Video fade-out is abnormal Fade: Video Mode: Wipe	㊶	IC59 pin 7 (μPC358 C)	DC 1.3 V ~ 10.7 V • "Manual" knob operation • "Auto" in and out operation (IC57 pin 1 is 2.0 V ~ 10.6 V)	NO: • Check IC55 in/out pins 8 and 9 (for Manual), pins 10, 11 (for Auto). • Check voltage of each pin of IC59. • Check connector CN8-5, 6, 7 and (manual knob) lead wires. YES: • Check ㊷.
	㊷	REC OUT Video terminal	Black fade 10 mV or less White fade 10 mV or less 0.86 V Adjust VR34 so that the signal level is minimum.	NO: • Check voltages and waveforms in the vicinity of IC15. • Check output voltage of IC57 pin 1. • Check connector CN29-1 and lead wires. • Adjust black fade level with VR31. • Adjust white fade level with VR32.
17. In Wipe operations, some patterns malfunction Mode: Wipe Manual/Auto: Manual * Final check should be done with monitor TV using Crosshatch pattern, etc. Refer to "Adjustment Procedure".	㊸	◧ or ◨ pattern is not possible Emitter of Q47	Approx. 6.7 V H SYNC Adjust linearity with VR59	NO: • Check horizontal sync signal from connector CN18-3 to Q46 base. YES: • Check ㊹.
	㊹	Emitter of Q51	◧ ON: 1.9 V ◨ ON: 1.9 V Adjust level with VR60. Adjust balance between both waves with VR62.	NO: • Check IC5 in/out pins 10, 11 pins 1, 2 and pins 3, 4. • According to the "Switching Truth Table", check gate No. 55 (pin 12), No. 57 (pin 13) and No. 58 (pin 5). • Check voltages and waveforms of Q50.
	㊺	⬓ or ⬒ pattern is not possible Emitter of Q40	Approx. 5.5 V V SYNC Adjust linearity with VR51.	NO: • Check the vertical sync signal from connector CN18-2 to Q39 base. YES: • Check ㊻.
	㊻	Emitter of Q84	⬓ ON: 1.7 V ⬒ ON: 1.7 V Adjust level with VR50. Adjust balance between both waves with VR55.	NO: • Check IC3 in/out pins 9, 8 and IC4 in/out pins 8, 9, 11 and 10. • According to "Switching Truth Table", check gate No. 50 (pin 6), No. 53 (pin 6) and No. 54 (pin 12). • Check voltages and waveforms of Q44.
* Final check should be done with monitor TV using Crosshatch pattern, etc. Refer to "Adjustment Procedure".	㊼	◧+◨ pattern is not possible IC2 pin 10 (TC4538BP)	12.0 V H SYNC Adjust VR63 so that the duty ratio becomes 50 %.	NO: • Check the horizontal sync signal from connector CN18-3 to IC2 pin 12. Check the vicinity of IC2. YES: • Check ㊽.
	㊽	Emitter of Q52	Approx. 3.1 V Adjust the linearity with VR64	NO: • Check the voltages and waveforms in the vicinity of Q52. YES: • Check ㊾.
	㊾	Emitter of Q51	Approx. 2.0 V Adjust VR65 so that the duty ratio becomes 5 %.	NO: • Check IC5 in/out pins 8, 9 and 1, 2. • According to "Switching Truth Table", check gate No. 57 (pin 13). • Check voltages and waveforms of Q50, Q51.

Symptom	Check point	Normal voltage and waveforms	Adjusting point and defect
	⑤⓪ ▀+▄ pattern is not possible IC2 pin 6	 Adjust VR56 so that the duty ratio becomes 50 %.	NO: • Check the vertical sync signal from connector CN18-2 to IC2 pin 5. • Check the vicinity of IC2. YES: • Check ⑤①.
	⑤① Emitter of Q45	Approx. 3.5 V Adjust linearity with VR57.	NO: • Check voltages and waveforms in the vicinity of Q45. YES: • Check ⑤②.
	⑤② Emitter of Q84	 Adjust level with VR58.	NO: • Check IC3 in/out pins 1, 2 and IC4 in/out pins 8, 9. According to "Switching Truth Table", check gate No. 51 (pin 13), No. 53 (pin 6). • Check voltages and waveforms of Q44, Q84.
	⑤③ ■ pattern is not possible Emitter of Q49	Approx. 4.4 V Adjust linearity with VR61.	NO: • Check ④③. • Check voltages and waveforms in the vicinity of Q48, Q49. YES: • Check ⑤④.
	⑤④ Emitter of Q42	Approx. 1.6 V Adjust linearity with VR52.	NO: • Check ④⑤. • Check voltages and waveforms in the vicinity of Q41, Q42. YES: • Check ⑤⑤.
	⑤⑤ Emitter of Q84	 Adjust balance with VR53. Adjust level with VR54.	NO: • Check IC3 in/out pins 11, 10, and IC4 pins 8, 9. • According to "Switching Truth Table", check gate No. 52 (pin 12), No. 53 (pin 6). • Check voltages and waveforms of Q43, Q44, Q84.
18. All wipe patterns are abnormal Mode: Wipe Manaul/Auto: Manual	⑤⑥ Select ◧ pattern IC8 pin 12 (μPC319 C)	 Variable with Manual knob	NO: • Check the wipe control voltage of connector CN22 pin 2. * DC 2.0 V → 10.9 V • NO: Check ⑥④. • Check voltages and waveforms in the vicinity of IC8. YES: • Check ⑤⑦.
	⑤⑦ IC6 pin 4 (TC4001BP)	Same waveform as above.	NO: • Check voltage from connector CN42-1 or CN19-3 to IC6 pin 5. * L (0.7 V) is O.K. NO: Check H gate according to "Switching Truth Table". YES: • Check "Wipe Gate Logic Diagram".
	⑤⑧ Select ▀ pattern IC8 pin 7 (μPC319 C)	 Variable with Manual knob	NO: • Check voltage from connector CN42-2 or CN19-2 to IC6 pin 9. * DC 1.2 V → 10.8 V • NO: Check ⑥④. • Check voltages and waveforms in the vicinity of IC8. YES: • Check ⑤⑨.

Symptom	Check point		Normal voltage and waveforms	Adjusting point and defect
	⑲	IC6 pin 10 (TC4001BP)	Same waveform as above.	NO: • Check voltage from connector CN42-2 or CN19-2 to IC6 pin 9. * L (0.7 V) is O.K. NO: Check V gate according to "Switching Truth Table". YES: • Check "Wipe Gate Logic Diagram".
19. Auto Cross Input mal-function. • Auto wipe does not function. Mode: Auto Cross Input Wipe pattern: Select any one	⑳	IC70 pin 2 Press START. (TC4013BP)	H level goes low	NO: • Check whether IC69 pins 5, 6, 4 are H or not. • Check whether IC70 pin 3 goes H by switching ON. YES: • Check ㉑.
	㉑	IC59 pin 1 Press START. (μPC358 C)	DC 10.9 V is changed to DC1.3 V, then DC 10.9 V resumes.	NO: • Check that Q100 base and collector are 11.5 V. • Check that IC58 pin 2 goes high from low. YES: • Check ㉒.
	㉒	IC56 pin 1 Press START. (μPC358 C)	IC59 pin 1 TP20 0.2 V 0 V * IC56 pin 1 START ON * Adjust VR44 so that the voltage of TP21 is 0.2 V lower than the max. voltage of TP20.	NO: • Check voltages of IC56 pins 1, 2, 3. YES: • Check ㉓.
	㉓	IC56 pin 7 START ON	IC59 pin 1 TP20 * 0.2 V IC56 pin 7 START ON * Adjust VR43 so that the voltage of TP22 is 0.2 V higher than the max. voltage of TP20.	NO: • Check IC56 pins 5, 6 and 7. YES: • Check ㉔.
	㉔	IC57 pin 1 START ON (TA5458P)	DC 10.9 V is lowered to DC 1.3 V, then DC 10.9 V resumes.	NO: • Check voltage changes of IC55 in/out pins 10, 11. Check that gate pin 12 is H. • Check voltage changes of IC59 pins 5, 6, and 7, and voltage change of IC57 pin 3. • Check that Q112 base is H.
• In the Auto Cross Input mode, inputs 1/2 are not changed.	㉕	IC68 pin 3	IC56 pin 7 IC66 pin 10 IC68 pin 3 IC70 pin 11 IC70 pin 13	NO: • Check voltages and waveforms of IC64 pins 4, 5, and 6, and in the vicinity of IC66. • Check IC68 pins 1, 2, 3 and IC67 pins 11, 12, 13. YES: • Check ㉖.
	㉖	IC70 pin 13		NO: • Check that IC69 pin 13 is H. (Auto Cross Input: ON) Check voltages in the vicinity of IC70. YES: • Check connector CN25-1, 2 and lead wires. • Check that IC27 gate pins 13, 5 are inverted to H/L respectively.

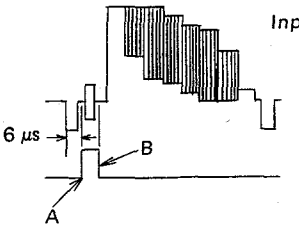
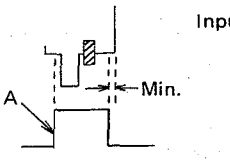
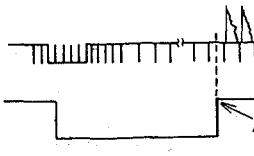
Symptom		Check point	Normal voltage and waveforms	Adjusting point and defect
20. Auto Wipe operation is abnormal Mode: Wipe Manual/Auto: Auto	⑥⑦	* Check items on ⑥⑩ to ⑥③. * Check that IC69 pins 9, 12 are low, and output pins 10, 11 are always low.		
21. Speed control is abnormal	⑥⑧	Impedance between IC58 pin 2 and VR42 center pin.	Approx. 500 kohms to 0 kohm (Power OFF)	NO: • VR42 is defective. • Check the peripheral pattern.
22. Switch operation is abnormal	⑥⑨	* Check each switch according to "Switching True Table" and check voltages of each part (connector pin) related with the points which are incorrect. * Check by "Switch function and operation mode table".		
23. No audio output at any output terminal.	⑦⓪	Emitter of Q70, 1070, Q71, 1071, Q72, 1072. (Channel to which signal is input)	Input: -10.0 dBVRMS  1 kHz -9.8 dBVRMS	NO: • Input 1: Check connector CN35 • Input 2: Check connector CN35 • AUX IN: Check connector CN3 • Check voltages and waveforms of all transistor.
24. No audio output at EFFECT MON. and REC OUT terminals (audio out terminals) (With BYPASS both ON and OFF)	⑦①	IC25 pin 1 (Rch) IC24 pin 7 (Lch)	 1 kHz -10 dBVRMS	NO: • Check voltages and waveforms in the vicinity of IC25, 24. YES: • Check connectors CN32 and 30.
25. No audio output at audio terminals of Effect Monitor and Rec Out terminals (When Bypass is OFF)	⑦②	IC26 pin 5 (R)	 1 kHz -17 dBVRMS	NO: • Check voltages and waveforms in the vicinity of IC26. • Check connector CN9-2, and balance VR. • Check that IC26 pin 1 (fade control pin) is approx. 1.0 V. YES: • Check voltages and waveforms of IC21 in/out pins 8, 9 (Rch) and IC23 in/out pins 11, 10 (Lch). • Check gate No. 12 (pin 6), No. 10 (pin 12) according to "Switching Truth Table".
26. Audio fader operation is abnormal Fade: Audio Manual/Auto: Manual	⑦③	IC26 pin 5 (R)	Max: -17 dBVRMS Min: -80 dBVRMS or below	NO: • Check that IC26 pin 1 is 1.0 V when output is maximum, and is 4.8 V when output is minimum. • YES: Check voltage in the vicinity of IC26. • NO: Check connector CN21-1. → Check ⑦④.
	⑦④	IC57 pin 7	DC 2.0 V (max) to 9.9 V (min) Variable with manual VR	NO: • Check voltages of IC57 pins 5, 6 and 7. (Voltage at IC57 pin 5 is approx. 5.5 V when Fader ON, and 0.7 V when Fader off.)

7. Adjustment Procedures

1. Adjustments related with the timing pulse

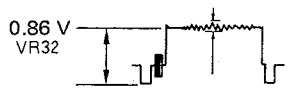
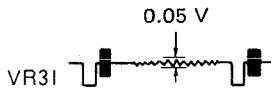
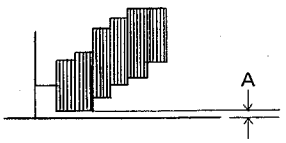
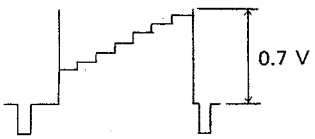
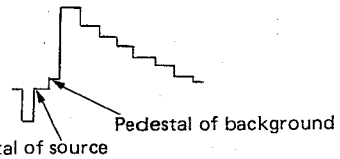
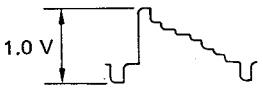
Input: Full-field color bar signal (white: 100 %), 1.0 Vp-p

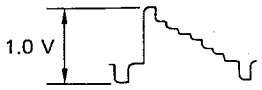
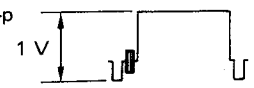
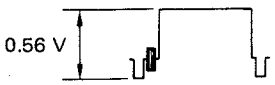
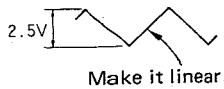
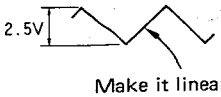
Measurement: 10 Mohms probe, using dual-trace oscilloscope. Voltage measurement using digital tester having impedance of 1 Mohms or more.

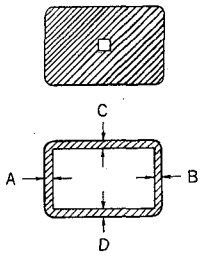
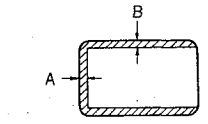
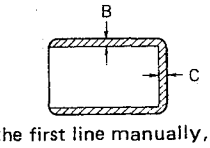
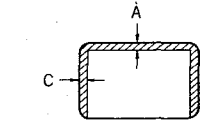
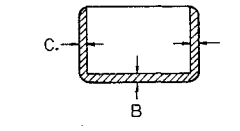
	Test point	Adjustment point	Name	Condition	Check point
1	IC49 pin 6	VR26 VR28	BURST WIDTH		 A: Set VR26 so that it comes in the middle between the burst and sync signals. B: Set VR28 so that it comes in the middle between the burst and video signals.
2	IC46 pin 10	VR29	H.BL		 Set A so that in the middle of the front porch.
3	IC45 pin 7	VR27	V.BL		 Set A so that it comes before the video signal.
4	IC56 pin 2 IC59 pin 1	VR44	TIM.U	Bypass: OFF Mode: EFFECT Wipe: Circle Manual/Auto: AUTO IN/OUT: IN	Set the potential of IC56 pin 2 0.2 V lower than that of IC59 pin 1. Ex: IC59 pin 1 . . . 10.8 V IC56 pin 2 . . . 10.6 V
5	IC56 pin 5	VR43	TIM.L	IN/OUT: OUT	Set the potential of IC pin 2 0.2 V higher than that of IC59 pin 1. Ex: IC59 pin 1 . . . 1.2 V IC56 pin 5 . . . 1.4 V
6	IC40 pin 15	VR-2	H.F freerun	Set so no signal is input.	Set to 15.620 ±25 Hz
7	IC280 pin 5, C113	C98	CHROMA freerunning	Set so no signal is input.	Set to 4.432607 ±25 Hz. Set to 4.43273 ±25 Hz.

2. Video signal level, wipe pattern adjustments

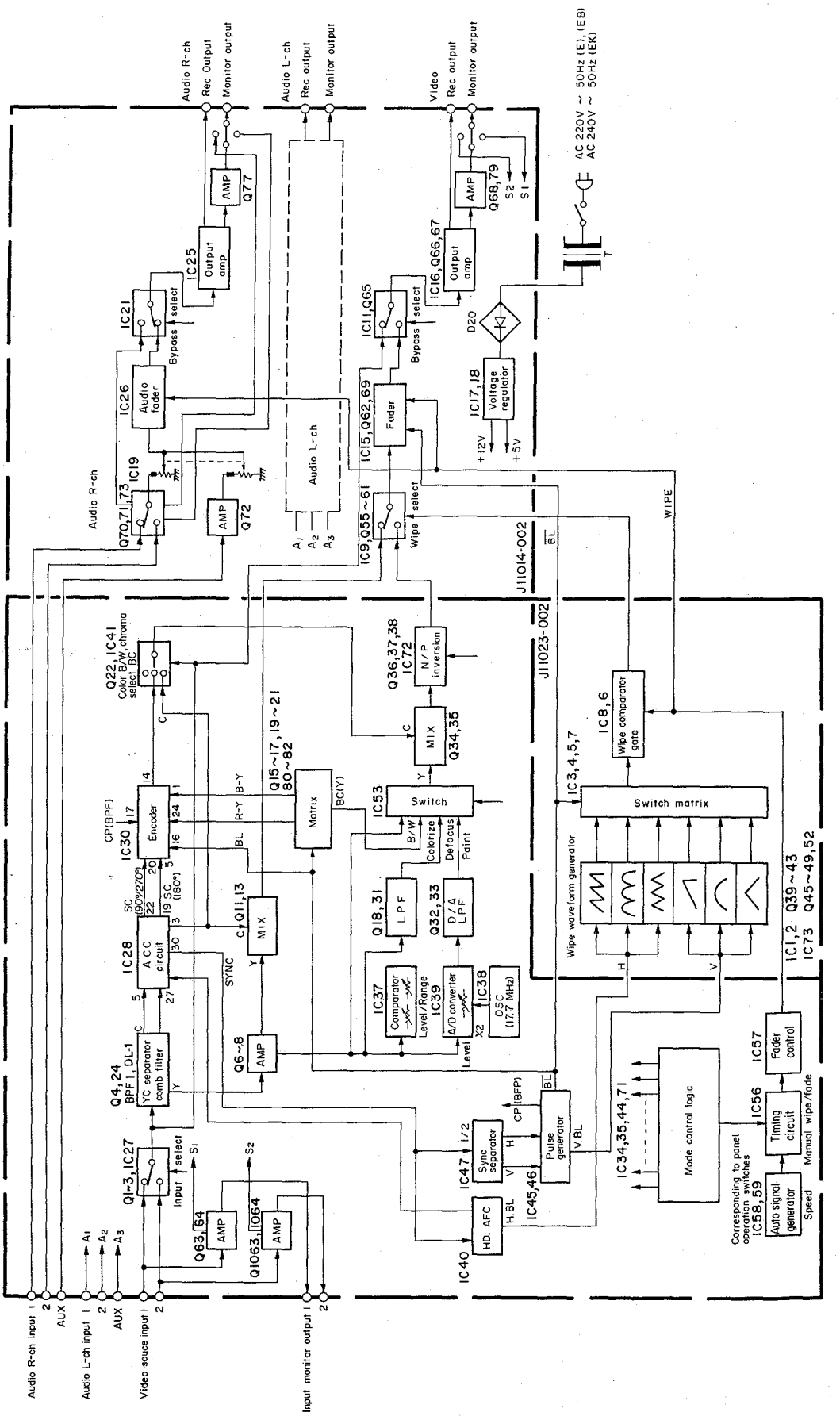
Input: Full-field color bar signal (white: 100 %), 1.0 Vp-p
Output: 75-ohm terminal resister (Video terminal of Effect monitor/Rec Out terminals)
Others: 10 mohms probe
Switch Operation: Bypass: OFF, Manual: ON, Manual control: Source when no designation

	Test point	Adjustment point	Name	Condition	Check point
1	Output pin	VR 35	Y level	Bypass ON	Set output level to 1 Vp-p. (Input: 1 Vp-p)
2	Output pin	VR 33	Y level	Bypass OFF	Set output level to 1 Vp-p. (Input: 1 Vp-p)
3	Output pin	VR 34	Fader	Chroma level: Set appropriately Manual/Auto: AUTO Fader: ON	
		VR 32	White	Color: White	Standard: 10 mV or less (Chroma signal)
		VR 31	Black	Color: Black	
		VR 41	Black	Manual/Auto: MANUAL	Set to MIN
4	Emitter of Q60	VR 19	POSI		Turn clockwise to MAX.
		VR 18	NEGA		Turn counter-clockwise from MAX position and adjust so that SYNC becomes flat. 
		VR 16	Offset	Adjust so that A becomes equal.	
	Output pin	VR 17	Level	Adjust so that B-W level becomes 0.70 V.	
5	Output pin	VR 30	Offset	Wipe pattern: Circle Effect: COLORIZE Color: Blue Range: MIN Manual: MIN	Match pedestal sections of source and background. 
6	Output pin	VR 17	Y level (Colorize, B/W)		Set Y level of background. 

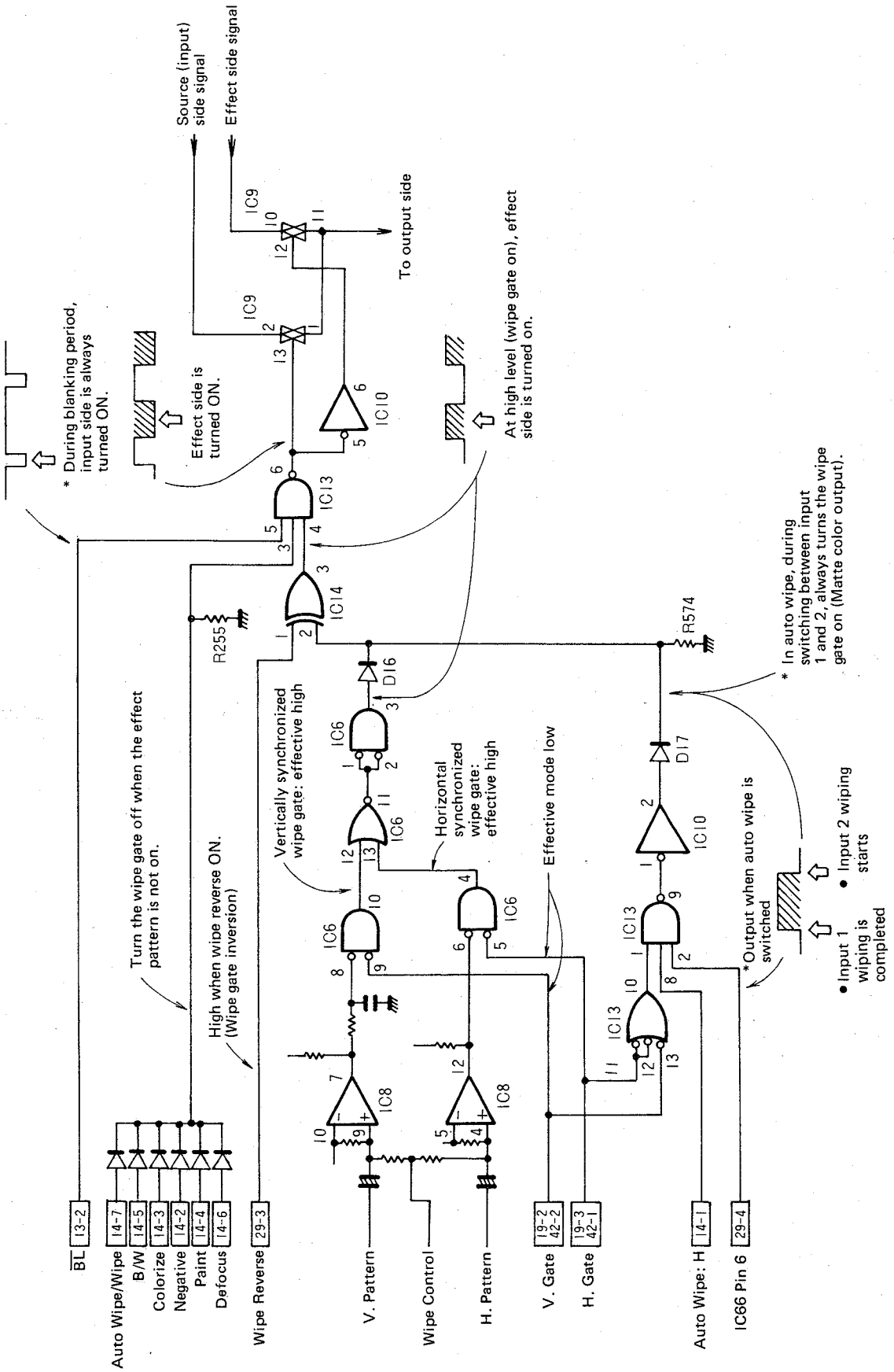
	Test point	Adjustment point	Name	Condition	Check point
7	Output pin	VR 15	Y level (Defocus)	Effect: DEFOCUS, COLORIZE	Set Y level of background. 
8	Emitter of Q30	VR 23	Paint		Set to DC 3.5 V.
9	Output pin	VR 24	Y level	Level: Fully clockwise Paint	Set to 1 Vp-p 
10	Output pin	VR 10	Y level (Back-ground)	Mode: WIPE Color: White	
11	C9 (Hot side)	VR-6 VR-8	Carrier balance Carrier balance	Color: Black	Set to MIN. Balanced point is different for black and white.
12	IC28 pin 14	VR-7		Color: Blue	Set to MAX.
13	Output pin Output pin Output pin	VR-5 VR-9 VR-11	Phase R-Y level Level		Set to mark Blue on the vectorscope. Set to mark Red on the vectorscope. Set to mark Red on the vectorscope.
14	Output pin	VR-3	C level (Source)	Mode: EFFECT Wipe pattern: (Upper) Color: Blue Effect: COLORIZE Level: MIN	Set to markings on vectorscope.
15	Output pin	VR 13 VR 14	C level (Effect) Phase (Effect)		Set to marking on the vectorscope. Set to markings on the vectorscope.
16	Emitter of Q47	VR 59	H ST LIN	Mode: WIPE Wipe pattern: Circle	
	Emitter of Q40	VR 51	V ST LIN		
		VR 61 VR 52 VR 54	H. PAL V. PAL PAL.LEV		Fully counter-clockwise Fully counter-clockwise Fully clockwise
	Screen Screen	VR 53 VR 67	PAL.BAL H.CENTER		Set the center of the circle to the center of the screen so that the circle is accurately circular. (H direction)
	Screen	VR 66	V.CENTER		Set the center of the circle to around the center of the screen. (V direction)
	Emitter of Q51	VR 65	HTA.LEV	Wipe pattern: H . . . 2 directions V . . . 2 directions	 Make it linear.
	Emitter of Q51	VR 64	HTA.LIN		• Set to Vp-p. • Make it linear.
	Emitter of Q84	VR 57	VTAL IN		 Make it linear.

Test point	Adjustment point	Name	Condition	Check point
Screen	VR 56 VR 63 VR 64 VR 57	VTA HALF HTA HALF HTALN V TAIN		Set to the around center of the screen.  (Adjust so that A and C comes to the first line from the edge.)
Screen	VR 60	HST LEV		 Set A to the first line manually, and adjust VR 60 so that B comes to the middle between 2nd and 3rd lines.
	VR 62	H BAL		 Set A to the first line manually, and adjust VR 62 so that B comes to the middle between 2nd and 3rd lines. Standard: 2.5 ±0.5
	VR 50	VST.LEV		 Set A to the first line manually, and adjust VR 50 so that B comes to the middle between 1st and 2nd lines. Standard: 1.5 ±0.5
	VR 55	V.BAL		 Set A to the first line manually, and adjust VR 55 so that B comes to the middle between 1st and 2nd lines. Standard: 1.5 ±0.5

8. Block Diagram



9. Wipe Gate Logic Diagram


Source (input) side signal
Effect side signal
To output side
* During blanking period, input side is always turned ON.
Effect side is turned ON.
At high level (wipe gate on), effect side is turned on.
IC9
IC10
IC13
IC14
R255
R574
D16
D17
IC6
IC8
* In auto wipe, during switching between input 1 and 2, always turns the wipe gate on (Matte color output).
Turn the wipe gate off when the effect pattern is not on.
High when wipe reverse ON. (Wipe gate inversion)
Vertically synchronized wipe gate: effective high
Horizontal synchronized wipe gate: effective high
Effective mode low
*Output when auto wipe is switched
• Input 1 wiping is completed
• Input 2 wiping starts
BL 13-2
Auto Wipe/Wipe 14-7
B/W 14-5
Colorize 14-3
Negative 14-2
Paint 14-4
Defocus 14-6
Wipe Reverse 29-3
V. Pattern
Wipe Control
H. Pattern
V. Gate 19-2 42-2
H. Gate 19-3 42-1
Auto Wipe: H 14-1
IC66 Pin 6 29-4

10. Switching Truth Table

1. Input/Output Switching

			Input side		Output side				
			Source		Rec Out		Monitor Out		
			1	2			Input 1	Effect Out	Input 2
Gate No.	Video		1	2	7	8	14	13	15
	Audio	L	3	4	9	10	18	16	20
		R	5	6	11	12	19	17	21
Switch Operation	Bypass	ON	–	–	H	L	–	–	–
		OFF	–	–	L	H	–	–	–
	Input Select	1	H	L	–	–	–	–	–
		2	L	H	–	–	–	–	–
	Monitor Select	Input 1	–	–	–	–	H	L	L
		Effect Out	–	–	–	–	L	H	L
		Input 2	–	–	–	–	L	L	H

Notes:
1. Dashes ("–") in each column show that the gate is not related to the function.
2. In the "ON condition table of each gate "below, "X" in mode columns shows the gate that the operation is turned OFF in that mode.

2. ON Condition Table of Each Gate

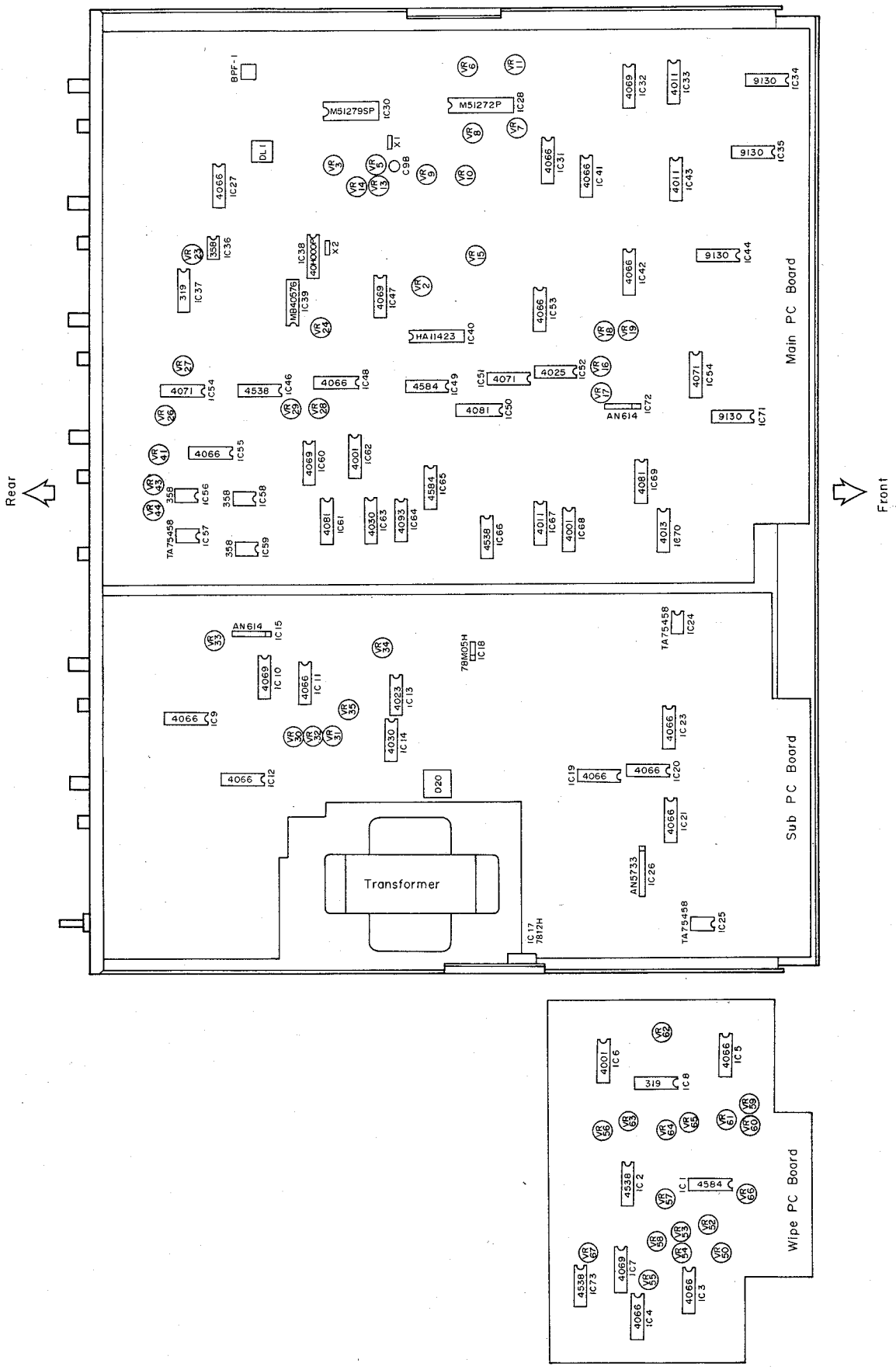
Gate			Mode			Condition to turn ON
			Auto Cross Input	Wipe	Effect	
Wipe	Manual	30	x	○	○	Goes high when Manual is ON
	Auto	31	○	○	○	Goes high when Auto is ON
Background (matte) Color	Yellow	33,34	–	–	–	Goes high when YL is ON
	Green	33	–	–	–	Goes high when GR is ON
	Red	34	–	–	–	Goes high when RD is ON
	Blue	35	–	–	–	Goes high when BL is ON
	White	33,34, 35	–	–	–	Goes high when WT is ON
Color Select	Chroma	36	–	–	–	Goes high when No. 38 is low "
	Background (Matte) color	37	–	–	–	* No. 36 and No. 37 voltages are reverse (H/L) to each other. * In Colorize mode, No. 37 gate goes high when the comparator IC37's output is high.
	B/W	38	–	–	–	Goes high when White or Black is selected for Color, or when B/W is selected for Effect. At this time, No. 36 and No. 37 gates go low.
Effect Select	B/W	39	x	x	○	Goes high when COLORIZE is ON
	Background (Matte) color	40	○	○	x	Goes high always in the modes on the left
	Defocus	41	–	–	–	Goes high when DEFOCUS is ON
	Paint	42	–	–	–	Goes high when PAINT is ON
Nega-tive	Negative	44	–	–	–	Goes high when NEGATIVE is ON
	Positive	45	–	–	–	Goes high when NEGATIVE is OFF
Wipe Select	Source (Input)	46	–	–	–	Refer to the "wipe gate logic diagram".
	Effect	47	–	–	–	
Fader	Black	48	–	–	–	Goes high when Black is selected for Color
	White	49	–	–	–	Goes high when Color other than white is selected
Wipe Pattern	V.ST	50	–	–	–	Goes high when wipe pattern ▀ or ▄ is ON. Goes low when No. 51 or No. 52 is high.
	V.TA	51	–	–	–	Goes high when ▀ and ▄ are ON simultaneously. Goes low when No. 50 or No. 52 is high.
	PAL	52	–	–	–	Goes high when ◘ is ON. Goes low when No. 50 or No. 51 is high.
	V POL	53	–	–	–	Goes high when No. 54 is low.
	V POL	54	–	–	–	Goes high when ▄ is ON and ▀ is OFF.
	H. ST	55	–	–	–	Goes high when ▌ or ▐ is ON. Goes low when No. 56 is high.
	H.TA	56	–	–	–	Goes high when ▌ and ▐ are ON simultaneously.
	H POL	57	–	–	–	Goes high when No. 58 is low, and goes low when No. 58 is high.
	H POL	58	–	–	–	Goes high when ▐ is ON and ▌ is OFF.

11. Switch Function and Operation Mode Table

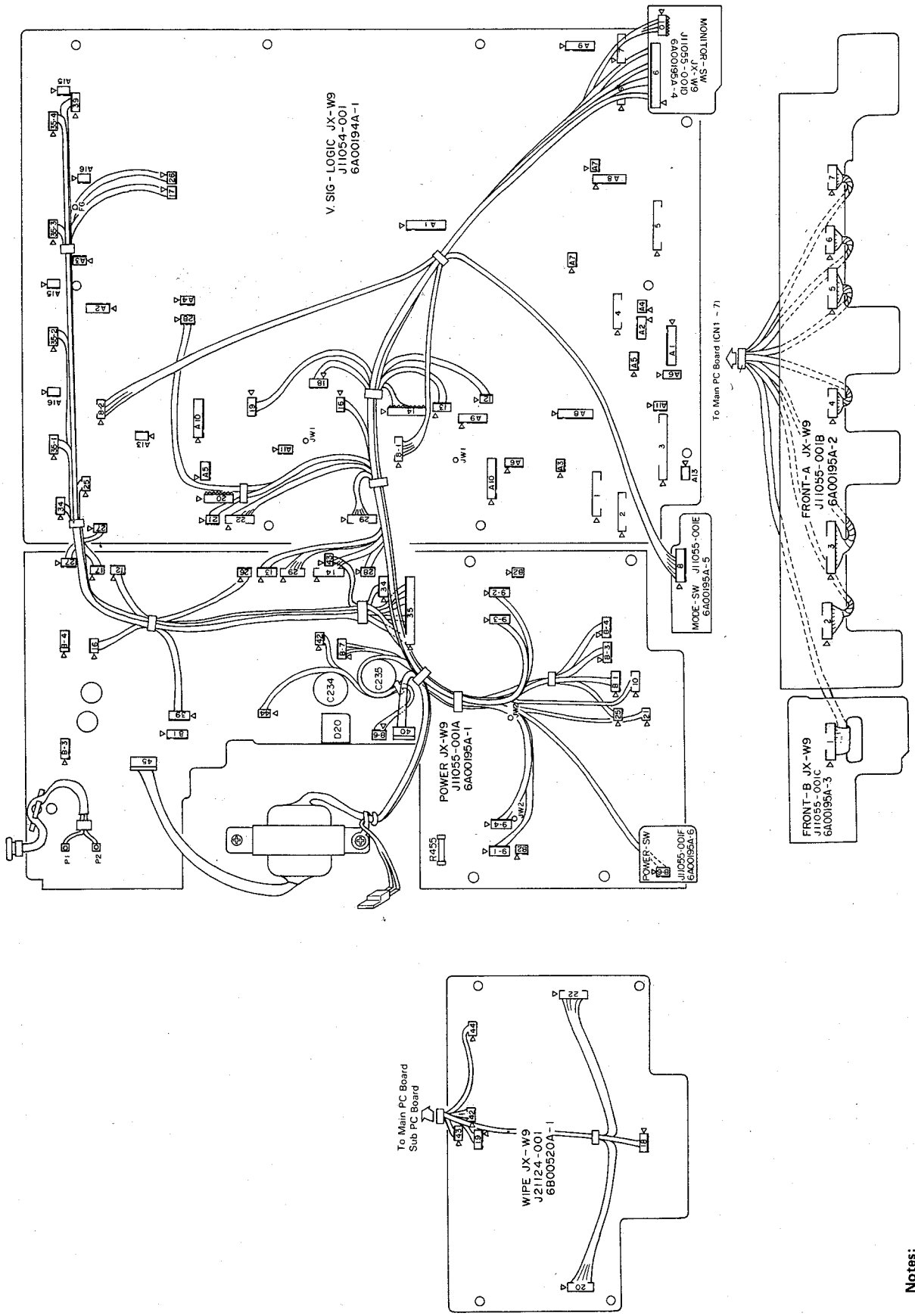
Operating Condition	Mode switch, etc.	ON Operation	OFF Operation	Remarks
(1) Power ON (Initialize)				
• Input select 1, 2	–	1	–	
• Manual/Auto	• Auto Cross Input • Wipe	Auto	–	
• "	Effect	Manual	–	
• IN/OUT	• Auto Cross Input • Wipe	IN	–	
• "	Effect	–	Both IN/OUT OFF	
• Wipe pattern	–	–	All OFF	
• Effect pattern	–	–	All OFF	
• Bypass	–	ON	–	
• Start	–	–	OFF	
• Wipe Reverse	–	–	OFF	
• Audio/Video Fader	–	–	Both OFF	
(2) Mode Select				
• Set to Auto Cross Input	–	Auto	Set Manual OFF	Does not function in Manual
"	–	IN	Set OUT OFF	
"	–	–	Set Wipe Reverse to OFF	Wipe Reverse does not function
• Set to WIPE	–	Auto	Set Manual to OFF	
"	–	IN	Set OUT to OFF	
"	–	–	Set Effect pattern to OFF	
• Set to EFFECT	–	Manual	Set AUTO to OFF	IN/OUT indicators go off. Pattern is not cancelled.
(3) Input select				
• Press 1	–	1	Set 2 to OFF	When 1 is ON, it is not changed.
• Press 2	–	2	Set 1 to OFF	When 2 is ON, it is not changed.
(4) Manual/Auto select				
• Press	Auto Cross Input	(Auto)		When Auto is ON, it is not changed.
• "	Wipe	Reversed		When Manual is ON, IN/OUT indicators are OFF.
• "	Effect	Reversed		
(5) Wipe Pattern select (After any pattern is selected)	(Mode change)	Continued		It is not cancelled by switching.
• Press ◧~⬓	–	Reversed	Set ◘ to OFF.	
• Press ◘		"	Set ◧~⬓ to OFF.	
(6) Effect pattern select				
• Press B/W	Effect	Reversed	Set Color OFF	
• Press Colorize	"	"	Set B/W to OFF	
• Press other patterns	"	"		
• Every function	Auto Cross Input with Wipe	–	All OFF	Does not function.

Operating Condition	Mode switch, etc.	ON Operation	OFF Operation	Remarks
(7) Start switch				
• Press	—	Start indicator lights		Only Auto ON functions.
• "	Auto Cross Input	OUT → IN		During initialization, IN lights.
• "	Wipe/Effect	IN/OUT reversed		
• Press (Start ON only)	—	—	—	Not changed.
(8) Wipe Reverse				
• Press	Auto Cross Input	—	—	Does not function. (OFF)
• "	Wipe/Effect	Reversed		
(9)Bypass				
• Press	—	Reversed		
(10) Audio/Video fader				
• Press	—	Reversed		

12. ICs and Adjusting Points Locations



13. Wiring Diagram

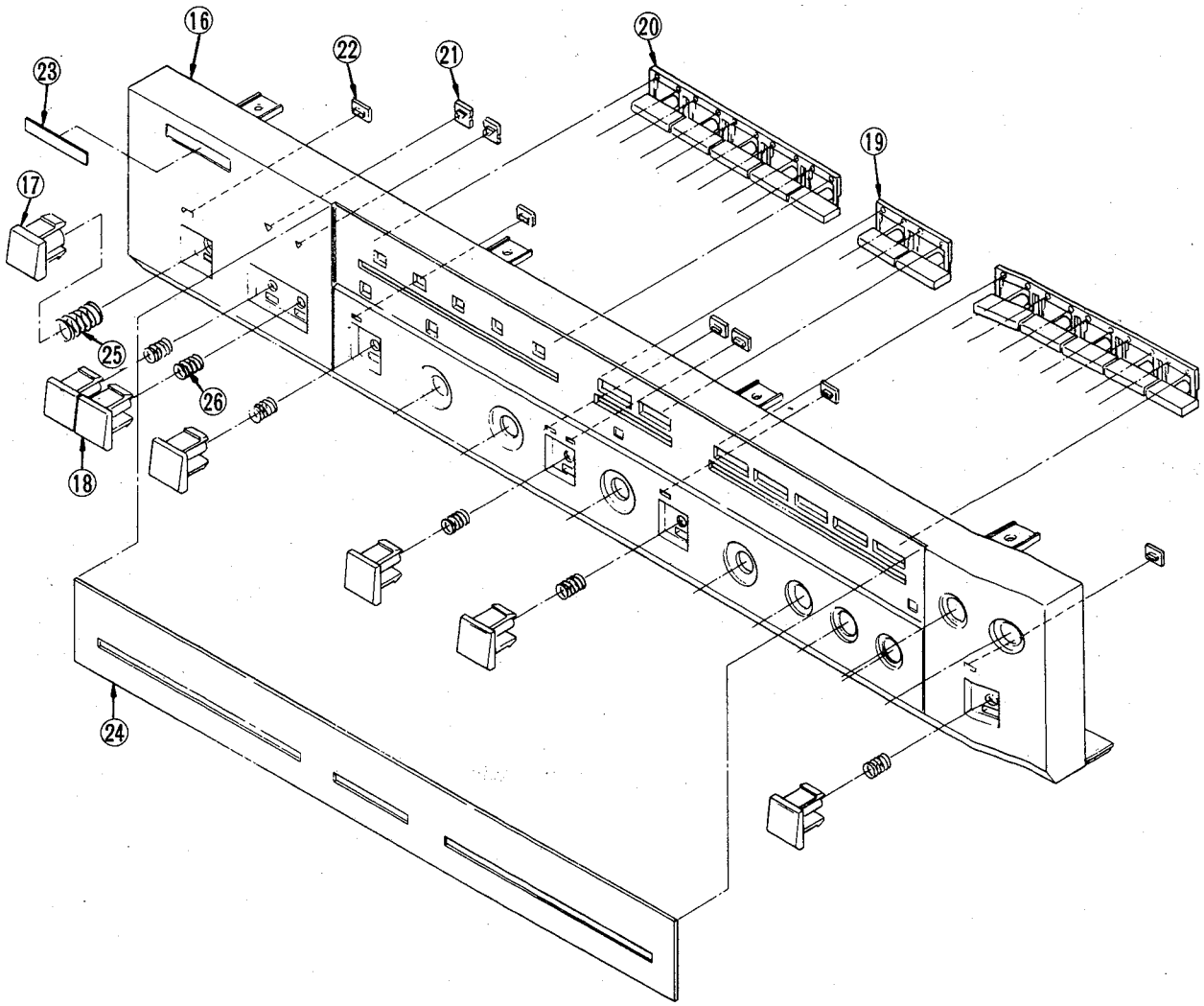


Notes:
- Numbers in the diagram show the connector numbers.
- Parts having mark A or B are not connectors, so they cannot be removed.

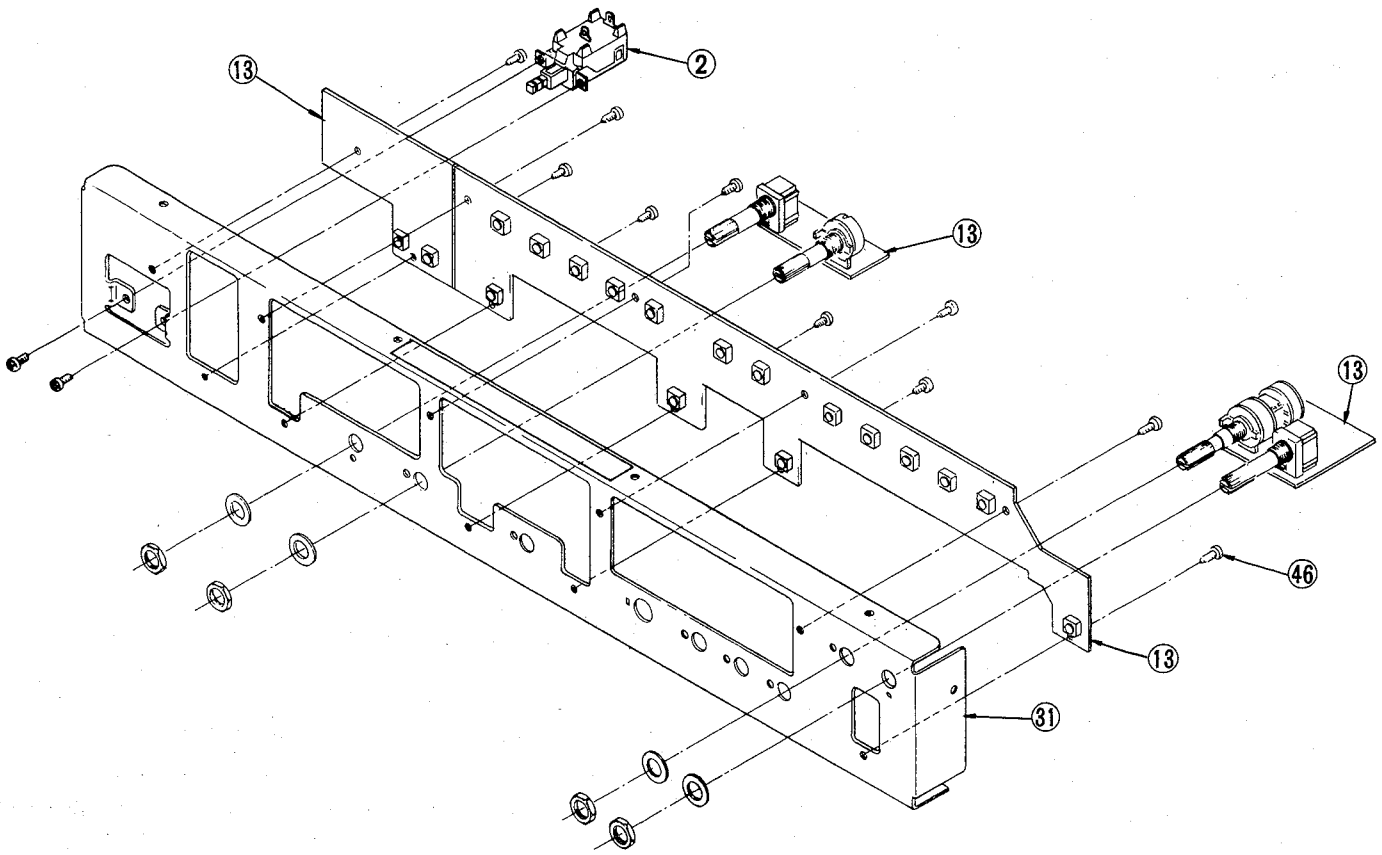
15. Electric Parts List

Safety Mark	Item No.	Symbol Number	Part Number	Part Name	Q'ty	Remarks
		ICs				
		IC26	AN5733	IC	1	Matsushita
		IC16	AN608	IC	1	Matsushita
		IC15, 72	AN614	IC	2	Matsushita
		IC40	HA11423	IC	1	Hitachi
		IC28	M51272P	IC	1	Mitsubishi
		IC30	M51279SP	IC	1	Mitsubishi
		IC39	MB40576	IC	1	Fujitsu
		IC24, 25, 57	TA75458P	IC	3	Toshiba
		IC6, 62, 68	TC4001BP	IC	3	Toshiba
		IC33, 43, 67	TC4011BP	IC	3	Toshiba
		IC70	TC4013BP	IC	1	Toshiba (or NEC μPD4013BC)
		IC13	TC4023BP	IC	1	Toshiba (or NEC μPD4023BC)
		IC52	TC4025BP	IC	1	Toshiba
		IC14, 63	TC4030BP	IC	2	Toshiba
		IC7, 10, 22, 32, 47, 60	TC4069UBP	IC	6	Toshiba
		IC50, 61, 69	TC4081BP	IC	3	Toshiba
		IC64	TC4093BP	IC	1	Toshiba
		IC38	TC40H000P	IC	1	Toshiba
		IC2, 45, 46, 66, 73	TC4538BP	IC	5	Toshiba
		IC1, 49, 65	TC4584BP	IC	3	Toshiba
		IC34, 35, 44, 71	TC9130P	IC	4	Toshiba
		IC8, 37	μPC319C	IC	2	NEC
⚠	1	IC36, 56, 58, 59	μPC358C	IC	4	NEC
⚠		IC17	μPC7812H	IC	1	NEC
⚠		IC18	μPC78M05H	IC	1	NEC
		IC3~5, 9, 11, 12, 19~21, 23, 27, 31, 41, 42, 48, 53, 55,	μPD4066BC	IC	17	NEC
		IC51, 54	μPD4071BC	IC	2	NEC
		Transistors				
		Q5, 7, 19, 27, 30, 32, 33, 40, 43, 47, 57, 64, 75, 79, 1064, 1075	2SA1115EF	Transistor	16	Mitsubishi
		Q1~4, 6, 8~18, 20~22, 24~26, 28, 29, 31, 34~39, 41, 44~46, 48~52, 55, 56, 58~63, 65~74, 76~78, 80~84, 1063, 1070~1074, 1076~1078	2SC2603EF	Transistor	76	Mitsubishi
		Q100, 102, 109, 112	DTA124ES	Digital Transistor	4	Rohm
		Q101, 103~108, 110	DTC124ES	Digital Transistor	8	Rohm
		Diodes				
⚠		D20	3B4B41LC1	Diodes	1	Toshiba
		D1~3, 6, 10~17, 150~152 154~168, 171~185, 203, 204	1SS119-04TJ	Diodes	47	Hitachi
		D201, 202	RD9.1ES B1	Zener Diodes	2	NEC
		D100, 103, 105~115, 117, 119~128	SLR-54MG	LED	24	Rohm
		D101, 116, 118, 129, 190	SLR-54VR	LED	5	Rohm
		VRs				
		VR22	J42757-001	VR	1	500Ω
		VR20, 21, 40	J42756-001	VR	3	5kΩ
		VR37	J42758-001	VR	1	10kΩ
		VR42	J42760-001	VR	1	500kΩ
		VR55, 62	J43409-501	Fixed Resistor	2	500Ω
		VR14, 41, 52	J43409-102	Fixed Resistor	3	1kΩ
		VR10, 16, 17, 23, 33, 34, 64	J43409-202	Fixed Resistor	7	2kΩ
		VR2, 8, 9, 13, 24, 30~32, 35, 50, 51, 54, 57~61, 65	J43409-502	Fixed Resistor	18	5kΩ
		VR6, 7, 11, 28, 29, 53, 63	J43409-103	Fixed Resistor	7	10kΩ
		VR15, 18, 19, 43, 44, 66	J43409-203	Fixed Resistor	6	20kΩ
		VR3, 5, 26, 27, 67	J43409-503	Fixed Resistor	5	50kΩ
		VR56	J43409-104	Fixed Resistor	1	100kΩ
		Switches				
⚠	2	S22	J42935-001	Push Switch	1	
		S1~18	J42766-001	Tact Switch	18	
		S19	J42767-001	Rotary Switch	1	
		S20, 21	J42768-001	Rotary Switch	2	

Front Panel Ass'y Exploded View



Sub Frame Ass'y Exploded View



Safety Mark	Item No.	Symbol Number	Part Number	Part Name	Q'ty	Remarks
		Transformers				
⚠	3	PT1	J43394-001	Power Transformer	1	for (E), (EB) models
⚠	3	PT1	J43399-001	Power Transformer	1	for (EK) models
		DL-1	J43410-001	Delay Line	1	With Trap
		BPF1	J43411-001	BPF	1	
		Coils				
		L3, 4, 9	J42574-330	Inductor	3	33μH
		L11~13	J42574-470	Inductor	3	47μH
		L1, 2, 6, 8, 10, 30~32	J42574-101	Inductor	8	100μH
		Capacitors				
		C240, 245, 246	QET41CM-475	Electrolytic Capacitor	3	4.7μF/16V
		C108, 117, 182, 200~205, 207~210, 214, 216~218, 222~224, 226, 227, 241	QET41CM-106	Electrolytic Capacitor	51	10μF/16V
		~243, 261, 262, 264, 265, 314, 650, 1200~1205, 1207~1210, 1214, 1216~1218, 1222~1224, 1226, 1227, 1314				
		C150	QEN41CM-106	Electrolytic Capacitor	1	10μF/16V (Non-polarity)
		C138, 220, 1220	QET41Cm-226	Electrolytic Capacitor	3	22μF/16V
		C1~6, 8, 12, 26, 29, 30, 45, 46, 55, 62, 66~68, 71, 72, 76, 78, 81, 82, 85, 86, 88,	QET41CM-476	Electrolytic Capacitor	54	47μF/16V
		104, 121, 124, 125, 128, 130, 132, 133, 144, 206, 215, 225, 230, 231, 247, 253, 266, 305~310, 1144, 1206, 1215, 1225				
		C40, 61, 63, 73, 77, 80, 101, 116, 129, 131, 137, 139, 213, 221, 255, 267, 302, 311, 1221	QET41CM-107	Electrolytic Capacitor	19	100μF/16V
		C219, 318, 1219	QET41CM-227	Electrolytic Capacitor	3	220μF/16V
		C140, 256	QET41CM-477	Electrolytic Capacitor	2	470μF/16V
		C141, 143, 145, 232, 1145	QET41CM-108	Electrolytic Capacitor	5	100μF/16V
		C234, 235	QET41VM-228	Electrolytic Capacitor	2	220μF/25V
		C254, 263	QET41VM-475	Electrolytic Capacitor	2	4.7μF/35V (Non-polarity)
		C13	QET41HM-474	Electrolytic Capacitor	1	0.47μF/50V
		C14, 22, 27, 74, 83, 84, 107, 153, 183, 211, 312	QET41HM-105	Electrolytic Capacitor	11	1μF/50V
		C19, 21, 79, 184, 185	QCT26CH-100	Ceramic Capacitor	5	CH10pF
		C89, 91	QCT26CH-200	Ceramic Capacitor	2	CH20pF
		C90	QCT26CH-220	Ceramic Capacitor	1	CH22pF
		C123, 70, 126	QCT26CH-270	Ceramic Capacitor	3	CH27pF
		C372	QCT26CH-560	Ceramic Capacitor	1	CH56pF
		C65, 93, 96, 111, 271, 273, 275	QCT26CH-101	Ceramic Capacitor	7	CH100pF
		C95	QCT26CH-151	Ceramic Capacitor	1	CH150pF
		C301, 303	QCT26CH-221	Ceramic Capacitor	2	CH220pF
		C20	QCT26CH-821	Ceramic Capacitor	1	CH820pF
		C38	QCS21HJ-080	Ceramic Capacitor	1	8pF
		C37	QCS21HJ-180	Ceramic Capacitor	1	18pF
		C9	QCS21HJ-270	Ceramic Capacitor	1	27pF
		C360	QCS21HJ-330	Ceramic Capacitor	1	33pF
		C109	QCS21HJ-680	Ceramic Capacitor	1	68pF
		C56	QCY41HJ-331	Ceramic Capacitor	1	330pF
		C320	QCY41HJ-471	Ceramic Capacitor	1	470pF
		C32, 134, 152, 154, 156~	QCY41HJ-102	Ceramic Capacitor	29	0.001μF
		175, 179~181, 187, 188				
		C272	QCY41HJ-472	Ceramic Capacitor	1	0.0047μF
		C7, 11, 25, 31, 35, 36, 39, 41, 44, 48, 49, 54, 57~59, 87, 113, 176, 317, 361, 356, 370, 371	QCF41HJ-103	Ceramic Capacitor	23	0.01μF
		C151, 189~191, 319	QCF41HJ-473	Ceramic Capacitor	5	0.047μF
		C33, 51, 64, 69, 75, 122, 127, 177, 178	QCC21EM-104	Ceramic Capacitor	9	0.1μF
		C274	QFV81HJ-223	SMF Capacitor	1	0.022μF
		C60	QFV81HJ-273	SMF Capacitor	1	0.027μF
		C269, 270	QFV81HJ-333	SMF Capacitor	2	0.033μF

Safety Mark	Item No.	Symbol Number	Part Number	Part Name	Q'ty	Remarks
		C16, 17, 34, 43, 50	QFV81HJ-473	SMF Capacitor	5	0.047μF
		C24, 233, 244	QFV81HJ-104	SMF Capacitor	3	0.1μF
		C268, 363	QFM71HJ-222	Mylar Capacitor	2	0.0022μF
		C92, 105	QFM71HJ-332	Mylar Capacitor	2	0.0033μF
		C112	QFM71HJ-562	Mylar Capacitor	1	0.0056μF
		C110	QFM71HJ-682	Mylar Capacitor	1	0.0068μF
		C94	QFM71HJ-103	Mylar Capacitor	1	0.01μF
		C106, 257, 258	QFM71HJ-153	Mylar Capacitor	3	0.015μF
		C259, 260	QFM71HJ-183	Mylar Capacitor	2	0.018μF
		C366	QFM71HJ-473	Mylar Capacitor	1	0.047μF
		C97	QFP32AJ-332	PP Capacitor	1	0.0033 μF/100 V
		C236	QFP32AJ-103	PP Capacitor	1	0.01 μF/100 V
		C98	QAT3001-300	Trimmer Capacitor	1	30 pF
		Resistors				
		R455	QRG022J-330	Metal Resistor	1	33Ω 2W
		R529, 543, 612, 614, 615, 1543	QRD125J-241	Carbon Resistor	6	240Ω 1/2W
		R246, 252, 1246	QRD14CJ-100	Carbon Resistor	3	10Ω 1/4W
		R175	QRD14CJ-150	Carbon Resistor	1	15Ω 1/4W
		R155, 157, 600	QRD14CJ-560	Carbon Resistor	3	56Ω 1/4W
		R42, 250, 254, 1250	QRD14CJ-680	Carbon Resistor	4	68Ω 1/4W
		R1, 8, 237	QRD14CJ-750	Carbon Resistor	3	75Ω 1/4W
		R4, 11, 43, 61, 66, 72, 82,	QRD14CJ-101	Carbon Resistor	21	100Ω 1/4W
		95, 159, 170, 172, 178, 183, 232, 248, 658, 681, 1248, 1376				
		R239, 249, 1249	QRD14CJ-121	Carbon Resistor	3	120Ω 1/4W
		R432	QRD14CJ-151	Carbon Resistor	1	150Ω 1/4W
		R234, 235, 608~611, 616	QRD14CJ-181	Carbon Resistor	7	180Ω 1/4W
		R243, 453	QRD14CJ-221	Carbon Resistor	2	220Ω 1/4W
		R97, 99, 108, 109, 173, 259, 601, 602, 605, 606, 664~667, 671, 677, 678,	QRD14CJ-271	Carbon Resistor	18	270Ω 1/4W
		688				
		R14, 94, 136, 137, 138, 139, 167, 216, 217, 231, 245, 428, 603, 604, 1245	QRD14CJ-331	Carbon Resistor	15	330Ω 1/4W
		R176, 434	QRD14CJ-391	Carbon Resistor	2	390Ω 1/4W
		R13, 17, 160, 470, 405, 546, 556, 1546, 1556	QRD14CJ-471	Carbon Resistor	9	470Ω 1/4W
		R55	QRD14CJ-511	Carbon Resistor	1	510Ω 1/4W
		R28, 47, 542, 550, 676, 683, 684, 1542, 1550	QRD14CJ-561	Carbon Resistor	9	560Ω 1/4W
		R162, 305, 312, 318, 319, 333, 335, 336, 344~346, 365	QRD14CJ-681	Carbon Resistor	12	680Ω 1/4W
		R38, 205, 313~317, 570	QRD14CJ-821	Carbon Resistor	8	820Ω 1/4W
		R19, 20, 24, 32, 44, 56, 58, 64, 67, 85, 86, 87, 89, 90, 104, 106, 110, 119, 140, 141, 142, 147, 148, 158, 161, 163, 236, 277,	QRD14CJ-102	Carbon Resistor	56	1kΩ 1/4W
		376, 416, 444, 502, 508, 512, 521, 530, 544, 553, 554, 575, 576, 656, 657, 682, 690, 693, 1502,				
		1508, 1512, 1521, 1530, 1544, 1553, 1554, 1575, 1576				
		R29, 59, 63, 211, 321, 415, 443	QRD14CJ-122	Carbon Resistor	7	1.2kΩ 1/4W
		R21, 34, 565, 654, 685	QRD14CJ-152	Carbon Resistor	5	1.5kΩ 1/4W
		R18, 25, 126, 258, 320, 334, 347, 454, 710	QRD14CJ-182	Carbon Resistor	9	1.8kΩ 1/4W
		R35, 80, 165, 407, 423, 424, 435, 660, 679	QRD14CJ-222	Carbon Resistor	9	2.2kΩ 1/4W
		R57, 60, 78, 79, 83, 105, 107, 400, 406, 408, 409, 430, 437	QRD14CJ-272	Carbon Resistor	13	2.7kΩ 1/4W
		R93, 212, 452, 661, 662	QRD14CJ-332	Carbon Resistor	5	4.4kΩ 1/4W
		R655	QRD14CJ-362	Carbon Resistor	1	3.6kΩ 1/4W

Safety Mark	Item No.	Symbol No.	Part Number	Part Name	Q'ty	Remarks
		R7, 62, 81, 120, 143, 145, 149, 152, 153, 154, 166, 169, 171, 174, 179, 188, 208, 209, 213, 214, 220, 225, 233, 457, 566, 617	QRD14CJ-392	Carbon Resistor	26	3.9kΩ 1/4W
		R5, 12, 54, 68, 71, 75, 103, 130, 135, 210, 267, 369, 414, 420, 425, 436, 438, 442, 447, 450, 461, 515, 516, 532, 533, 549, 567,	QRD14CJ-472	Carbon Resistor	36	4.7kΩ 1/4W
		573, 687, 694, 1515, 1516, 1532, 1533, 1549, 1573 R15, 46, 523, 524, 680, 1523, 1524	QRD14CJ-562	Carbon Resistor	7	5.6kΩ 1/4W
		R240, 372~374, 404, 427, 433	QRD14CJ-682	Carbon Resistor	7	6.8kΩ 1/4W
		R45, 92, 146, 219	QRD14CJ-882	Carbon Resistor	4	8.2kΩ 1/4W
		R17, 37, 48~50, 102, 181, 185,218,223,257,278,283	QRD14CJ-103	Carbon Resistor	50	10kΩ 1/4W
		285, 302, 304, 306, 326, 359, 362 ~364, 366, 370, 402, 417, 431, 451, 456, 504, 509, 514, 526, 539, 541, 555, 569, 613, 663,				
		669, 1504, 1509, 1514, 1526, 1539, 1541, 1555				
		R241, 410, 439, 510, 1510	QRD14CJ-123	Carbon Resistor	5	12kΩ 1/4W
		R98, 101, 180, 184, 187, 189, 190, 247, 422, 448,	QRD14CJ-153	Carbon Resistor	17	15kΩ 1/4W
		525, 540, 558, 1247, 1525, 1540, 1558				
		R224, 270	QRD14CJ-183	Carbon Resistor	2	18kΩ 1/4W
		R16, 38, 40, 51~53, 100, 144, 164, 168, 207, 215, 545, 1545	QRD14CJ-223	Carbon Resistor	14	22kΩ 1/4W
		R22, 39, 429, 462	QRD14CJ-273	Carbon Resistor	4	27kΩ 1/4W
		R151, 244, 269, 280, 284, 371, 411~413, 418, 419, 421, 440, 441, 445, 446,	QRD14CJ-333	Carbon Resistor	24	33kΩ 1/4W
		449, 459, 460, 527, 528, 571, 1244, 1571				
		R36	QRD14CJ-393	Carbon Resistor	1	39kΩ 1/4W
		R69, 70, 74, 131, 132, 133, 134, 177, 226, 227, 228,	QRD14CJ-473	Carbon Resistor	42	47kΩ 1/4W
		229, 230, 238, 251, 253, 268, 279, 342, 343, 517~519, 534~536, 551, 552, 563, 564, 568, 1251, 1517~1519, 1534~1536,				
		1551, 1552, 1563, 1564				
		R26	QRD14CJ-563	Carbon Resistor	1	56kΩ 1/4W
		R23, 33, 65	QRD14CJ-683	Carbon Resistor	3	68kΩ 1/4W
		R360, 520, 1520	QRD14CJ-823	Carbon Resistor	3	82kΩ 1/4W
		R150, 182, 186, 191, 192,	QRD14CJ-104	Carbon Resistor	75	100kΩ 1/4W
		221, 255, 271~276, 281, 282, 286, 291~294,300, 303, 307~311, 321~325, 327~332, 337~341, 348~358, 361, 367,				
		368, 381, 382, 458, 537, 538, 559~562, 572, 574, 651~653, 1537, 1538, 1562, 1572 R2, 3, 9, 10, 500, 501, 505,	QRD14CJ-124	Carbon Resistor	14	120kΩ 1/4W
		506, 511, 1500, 1501, 1505, 1506, 1511				
		R547, 1547	QRD14CJ-154	Carbon Resistor	2	150kΩ 1/4W
		R503, 507, 513, 522, 548, 1503, 1507, 1513, 1522,	QRD14CJ-334	Carbon Resistor	10	330kΩ 1/4W
		1548				
		R464	QRD14CJ-394	Carbon Resistor	1	390kΩ 1/4W
		R6, 41	QRD14CJ-474	Carbon Resistor	2	470kΩ 1/4W
		R206, 256	QRD14CJ-105	Carbon Resistor	2	1MΩ 1/4W

Safety Mark	Item No.	Symbol Number	Part Number	Part Name	Q'ty	Remarks
		Cable Assemblies				
		CN1	J43418-001	Cable Ass'y	1	8-8pin
		CN2	J43419-001	Cable Ass'y	1	8pin
		CN3	J43420-001	Cable Ass'y	1	12-12pin
		CN4	J43421-001	Cable Ass'y	1	6-6pin
		CN5	J43422-001	Cable Ass'y	1	9-9pin
		CN6	J43423-001	Cable Ass'y	1	6-6pin
		CN7	J43424-001	Cable Ass'y	1	5-5pin
		CN8	J43425-001	Cable Ass'y	1	7-4/3pin
		CN9	J43426-001	Cable Ass'y	1	12-3x4pin
		CN10	J43427-001	Cable Ass'y	1	4-4pin
		CN12	J43428-001	Cable Ass'y	1	2-2pin
		CN13	J43429-001	Cable Ass'y	1	3-3pin
		CN14	J43430-001	Cable Ass'y	1	7-7pin
		CN16	J43431-001	Cable Ass'y	1	2-2pin
		CN17	J43432-001	Cable Ass'y	1	2-2pin
		CN18	J43433-001	Cable Ass'y	1	3-3pin
		CN19	J43434-001	Cable Ass'y	1	3-3pin
		CN20	J43435-001	Cable Ass'y	1	5-5pin
		CN21	J43436-001	Cable Ass'y	1	2-2pin
		CN22	J43437-001	Cable Ass'y	1	5-5pin
		CN25	J43438-001	Cable Ass'y	1	2-2pin
		CN26	J43439-001	Cable Ass'y	1	2-2pin
		CN27	J43440-001	Cable Ass'y	1	2-2pin
		CN28	J43441-001	Cable Ass'y	1	2-2pin
		CN29	J43442-001	Cable Ass'y	1	5-5pin
		CN34	J43443-001	Cable Ass'y	1	3-3pin
		CN35	J43444-001	Cable Ass'y	1	12-3x4pin
		CN39	J43445-001	Cable Ass'y	1	3-3pin
		CN42	J43446-001	Cable Ass'y	1	2-2pin
		CN43	J43447-001	Cable Ass'y	1	2-2pin
		CN44	J43448-001	Cable Ass'y	1	2-2pin
		NOTE: Parts with A or B are not connectors. Then cannot be removed.				
		A1	J43449-001	Cable Ass'y	1	7-7pin
		A2	J43450-001	Cable Ass'y	1	4-4pin
		A3	J43451-001	Cable Ass'y	1	2-2pin
		A4	J43452-001	Cable Ass'y	1	2-2pin
		A5	J43453-001	Cable Ass'y	1	3-3pin
		A6	J43454-001	Cable Ass'y	1	3-3pin
		A7	J43455-001	Cable Ass'y	1	2-2pin
		A8	J43456-001	Cable Ass'y	1	6-6pin
		A9	J43457-001	Cable Ass'y	1	5-5pin
		A10	J43458-001	Cable Ass'y	1	7-7pin
		A11	J43459-001	Cable Ass'y	1	2-2pin
		A13	J43460-001	Cable Ass'y	1	2-2pin
		A15	J43461-001	Cable Ass'y	1	2-2pin
		A16	J43462-001	Cable Ass'y	1	2-2pin
		B1	J43463-001	Cable Ass'y	1	4-4pin
		B2	J43464-001	Cable Ass'y	1	2-2pin
		B3	J43465-001	Cable Ass'y	1	3-3pin
		B4	J43466-001	Cable Ass'y	1	3-3pin
		B6	J43467-001	Cable Ass'y	1	2-2pin
		B7	J43468-001	Cable Ass'y	1	3-1x3pin
		Others				
		X1, 2	J43413-001	Crystal	2	17.734475MHz
⚠	4		QMP3900-200H	Power Cord	1	for (E), (EB) models
⚠	4		QMP9017-008BS	Power Cord	1	for (EK) models
⚠	5		QHS3876-162	Cord Stopper	1	for (E), (EB) models
⚠	5		QHS3876-162BS	Cord Stopper	1	for (EK) models
⚠	6		J43414-001	Glass Tube	3	ϕ3, 20mm
⚠	7	P1, 2	J43398-001	Terminal Post	2	Power Cord Connect Pin
	8	PJ1~4, 6, 7	J42996-001	BNC/2-Pin Jack	6	
	9	PJ5	J43417-001	2-Pin Jack	1	
⚠	10	CN40	J43396-001	Terminal Socket	1	For connection to the cord on the secondary side of the power transformer
⚠	11	CN45	J43397-001	Terminal Socket	1	For connection to the cord on the primary side of the power transformer
		Printed Circuit Boards				
	12		J11058-001	Main PCB Ass'y	1	
			J11054-001	Main PCB	1	
	13		J11059-001	Sub PCB Ass'y	1	-001A ~ -001F
			J11055-001	Sub PCB	1	
	14		J21131-001	Wipe PCB Ass'y	1	
			J21124-001	Wipe PCB	1	

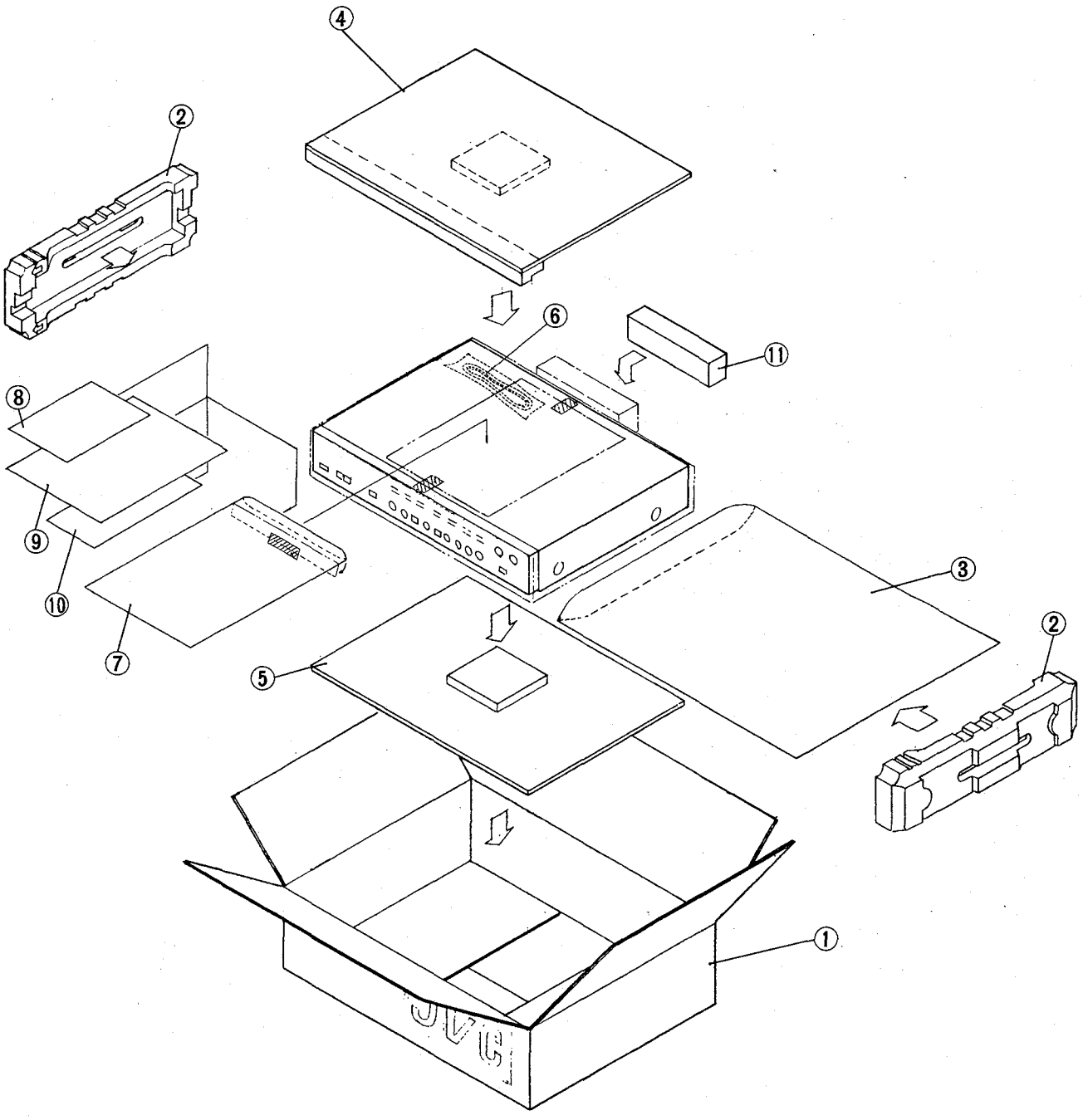
- PC board ass'y will not be supplied.
- ⚠ shows safety parts. Be sure to use the specified part.

16. Mechanical Parts List

Safety Mark	Item No.	Part No.	Part Name	Q'ty	Remarks
	15	J11031-003	Front Panel Ass'y	1	
	16	J11032-003	Front Panel	1	
	17	J42829-002	Key Top A	1	
	18	J42830-002	Key Top B	6	
	19	J42831-002	Key Top C	1	
	20	J42832-002	Key Top D	2	
	21	J42833-001	Lens A	2	
	22	J42834-001	Lens B	6	
	23	J42938-001	Name Plate	1	
	24	J42836-002	Escutcheon	1	
	25	J42837-003	Coil Spring A	1	
	26	J42838-002	Coil Spring B	6	
	27	J42839-001	Knob A	3	
	28	J42840-001	Knob B	5	
	29	J42859-001	Knob C	1	For COLOR switch, marks are attached on the rear
	30	J42841-001	Sub Frame Ass'y	1	
	31	J42842-001	Sub Frame	1	Nonwoven fabric (100 x 10) included
	32	J43402-001	Rear Panel	1	for (E), (EB) models
	32	J43402-002	Rear Panel	1	for (EK) models
	33	J42952-003	Top Cover Ass'y	1	Four neoprene rubber sheets inciuded
	34	J42845-002	Chassis	1	
	35	J42846-001	Bottom Cover	1	
	36	J42847-001	Reinforcement Plate	1	Shrinking vinyl tube included
	37	J43103-001	Foot	4	
	38	J42848-001	Holder A	10	For Main PC Board
	39	J43471-001	Holder B	4	For Wipe PC Board
	40	J43403-001	Holder C	8	For Sub PC Board
	41	J42864-001	Pad	1	
	42	J43404-001	Wire Holder	1	
	43	J43405-001	Wire Clamper	1	
⚠	44	J43305-001	Barrier Sheet	1	
	45	SDSC3006	Screw	3	⊕Binding, ϕ3 x 6
	46	SDSG3006	Tapping Screw	28	⊕Binding, B-tight, ϕ3 x 6
	47	SDSG3008M	Tapping Screw	26	⊕Binding, B-tight, ϕ3 x 8 (Black)
	48	SDST4006	Tapping Screw	2	⊕Binding, S-tight, ϕ4 x 6
	49	SDST4003M	Tapping Screw	4	⊕Binding, S-tight, ϕ4 x 8 (Black)
	50	WLS3000Z	Washer	1	
	51	NNS3000Z	Nut	1	M3

The Marks for Designated Areas
(EK) . . . U.K.
(EB) . . . Norway, Sweden, Finnland, Denmark, Switzerland
(E) . . . . Europe (other countries)

17. Packing Materials and Parts Numbers



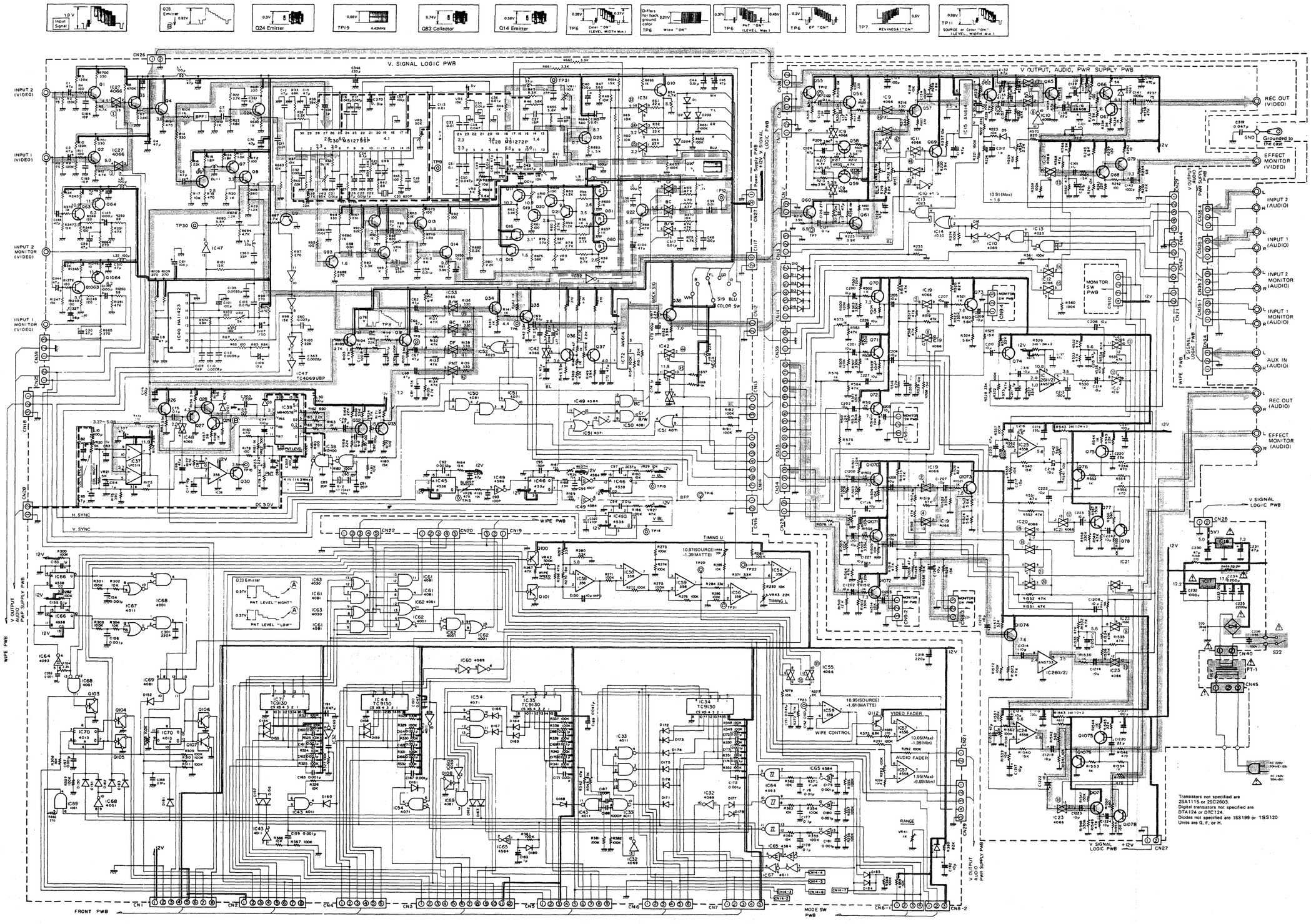
Item No.	Part No.	Part Name	Q'ty	Remarks
1	PK-JXW9E	Packing Case	1	J11060-001 for (E) models
1	PK-JXW9EB	Packing Case	1	J11060-002 for (EB) models
1	PK-JXW9EK	Packing Case	1	J11060-003 for (EK) models
2	J21071-001	Packing Pad (1)	2	
3	J42852-001	Envelope (1)	1	for Main Unit, (E), (EB) models
3	J43400-001	Envelope (1)	1	for Main Unit, (EK) models
4	J42860-001	Packing Pad (2)	1	for Top
5	J42861-001	Packing Pad (3)	1	for Bottom
6	QPGA010-02504	Envelope (2)	1	for Power Cord
11	J43401-001	Packing Pad (4)	1	for Rear

18. Accessories List

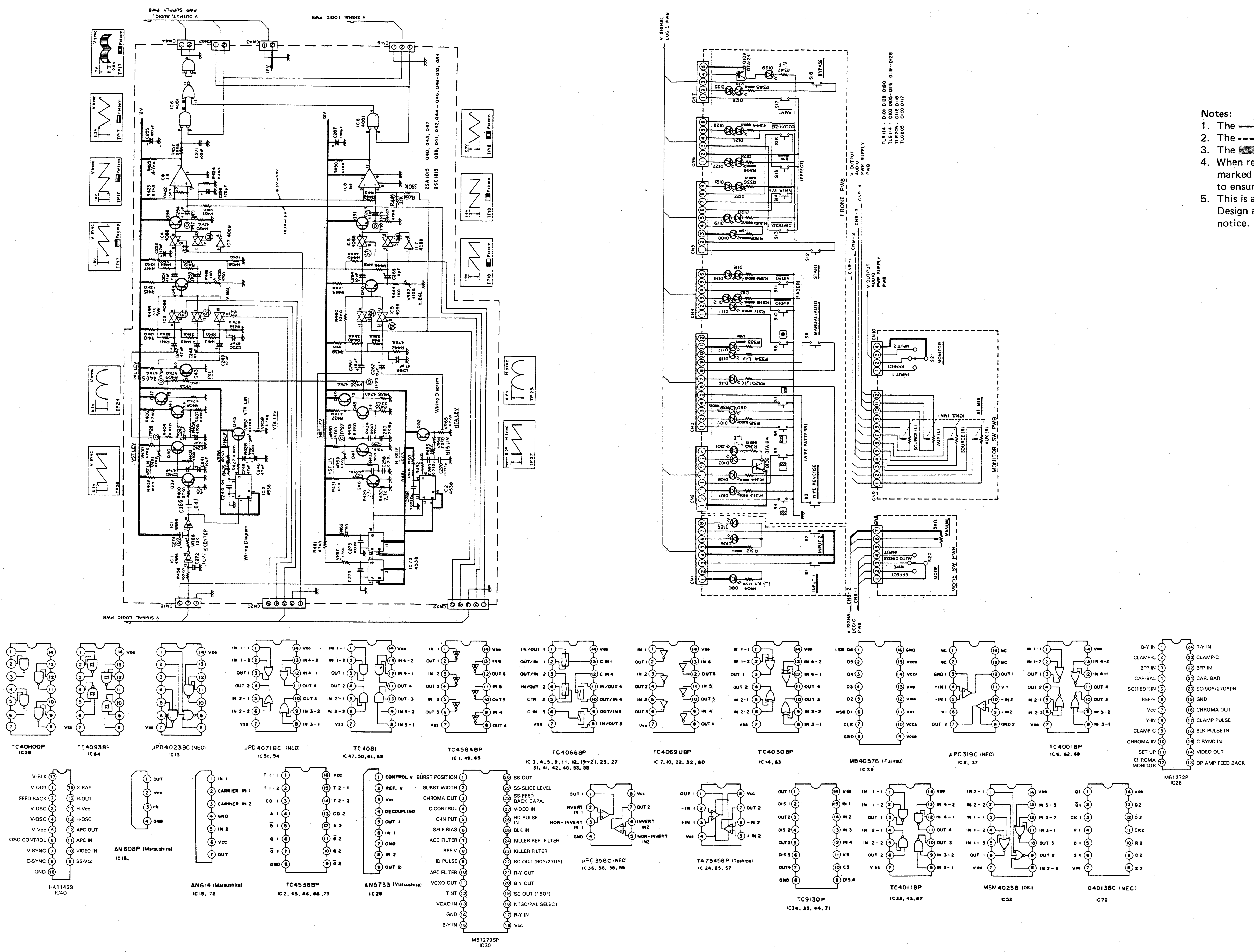
Item No.	Part No.	Part Name	Q'ty	Remarks
7	QPGA025-03505	Envelope	1	for Accessories, (E), (EB) models
7	E300196-010B	Envelope	1	for Accessories, (EK) modesl
8	BT20060	Warranty Card	1	(EK) models only
9	J5500-026A	Instruction Book	1	
10	BT20066	EEC Agency	1	

The marks for Designated Areas
(EK) . . . . . U.K.
(EB) . . . . . Norway, Sweden, Finnland, Denmark, Switzerland
(E) . . . . . Europe (other countries)

19. Schematic Diagram

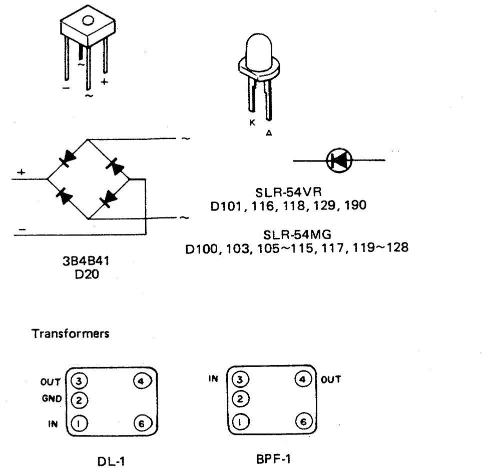


(No. 70053)


V OUTPUT, AUDIO, PWR SUPPLY PWB
V SIGNAL LOGIC PWB
FRONT PWB
MONITOR SW PWB
MODE SW PWB
Wiring Diagram
TC40H00P
IC38
TC4093BP
IC64
µPD4023BC (NEC)
IC13
µPD4071BC (NEC)
IC51, 54
TC4081
IC47, 50, 61, 69
TC45848P
IC1, 49, 65
TC4066BP
IC 3, 4, 5, 9, 11, 12, 19~21, 23, 27 31, 41, 42, 48, 53, 55
TC4069UBP
IC 7, 10, 22, 32, 60
TC4030BP
IC14, 63
MB40576 (Fujitsu)
IC59
µPC319C (NEC)
IC8, 37
TC4001BP
IC6, 62, 68
M51272P
IC28
HA11423
IC40
AN608P (Matsushita)
IC16,
AN614 (Matsushita)
IC15, 72
TC4538BP
IC2, 45, 46, 66, 73
AN5733 (Matsushita)
IC26
M51279SP
IC30
µPC358C (NEC)
IC36, 56, 58, 59
TA75458P (Toshiba)
IC 24, 25, 57
TC9130P
IC34, 35, 44, 71
TC4011BP
IC33, 43, 67
MSM4025B (OKI)
IC52
D4013BC (NEC)
IC70

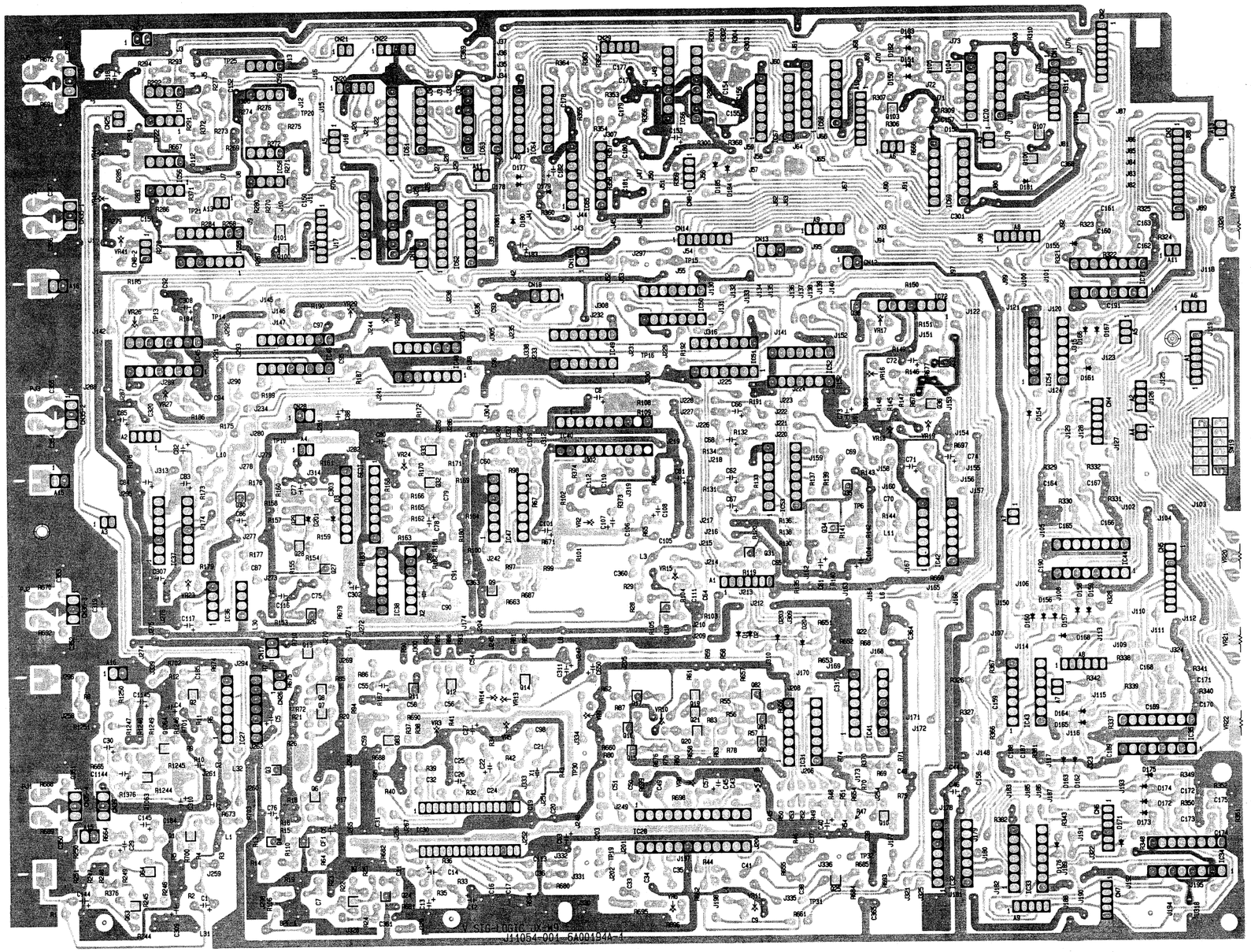
Notes:

1. The ——— line indicates the B (12 V) power supply.
2. The ----- line indicates the B (5 V) power supply.
3. The ▒▒▒ line indicates the signal path.
4. When replacing parts in the shaded areas (▒▒▒) marked ⚠, be sure to use only the designated parts to ensure safety.
5. This is a standard circuit diagram.
   Design and contents are subject to change without notice.

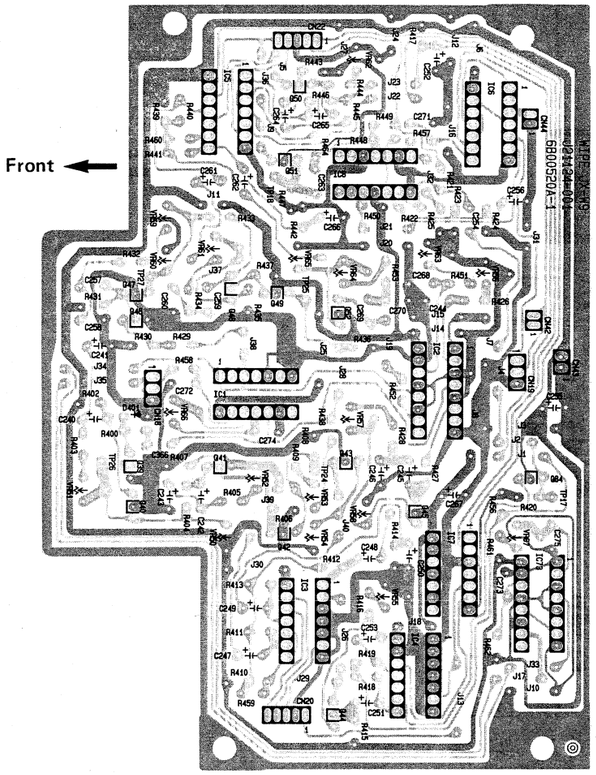


20. Printed Circuit Boards (Reduced to approx. 80 % real size.)

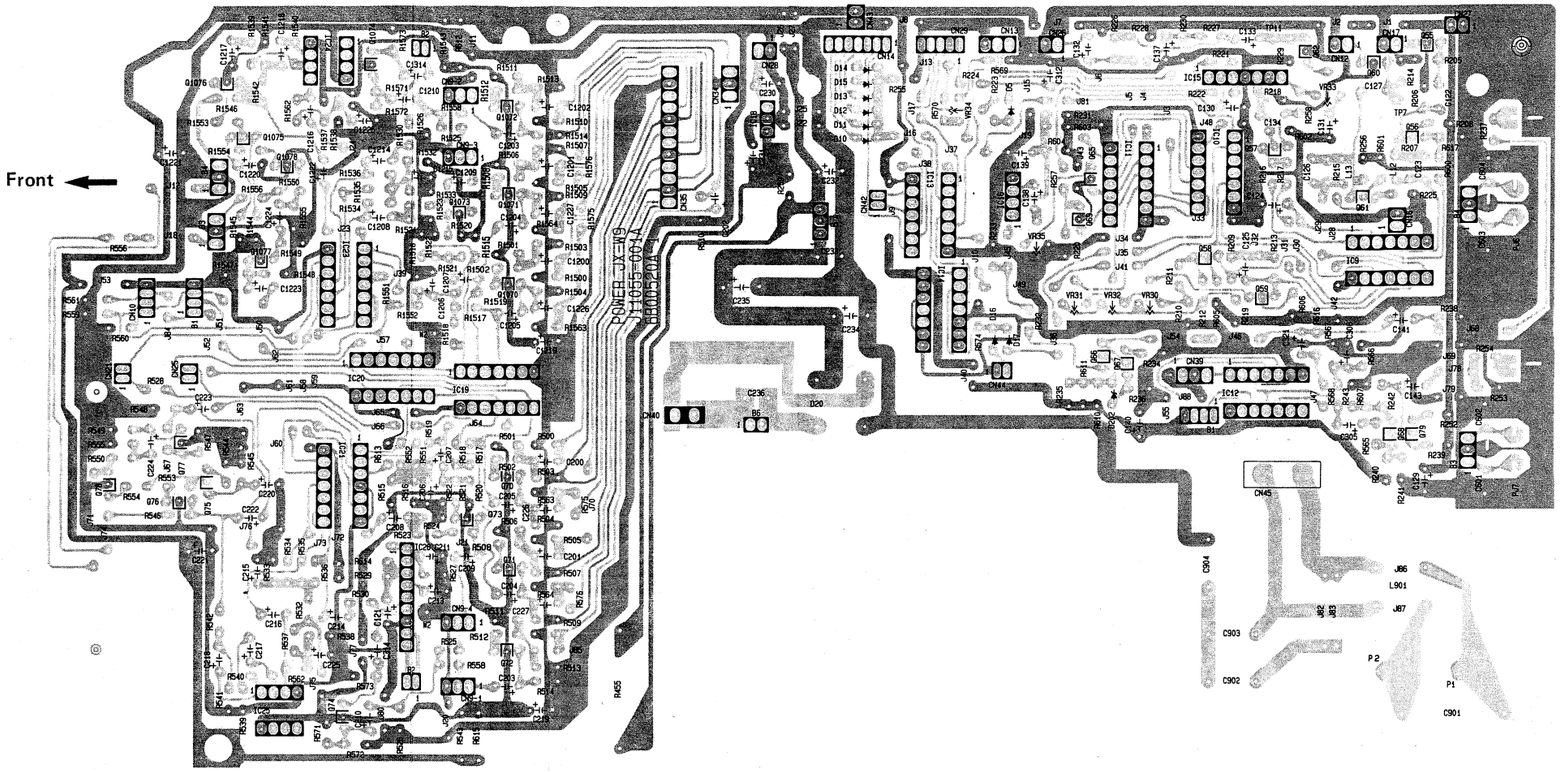
- Main P.C. Board



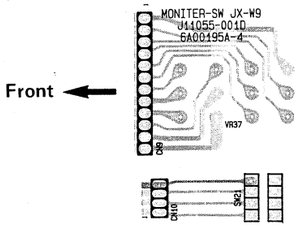
- Wipe P.C. Board



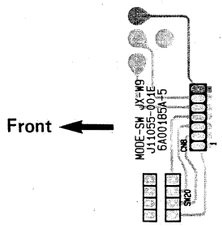
- Sub P.C. Board



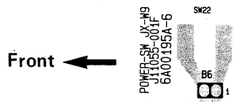
- Monitor SW P.C. Board



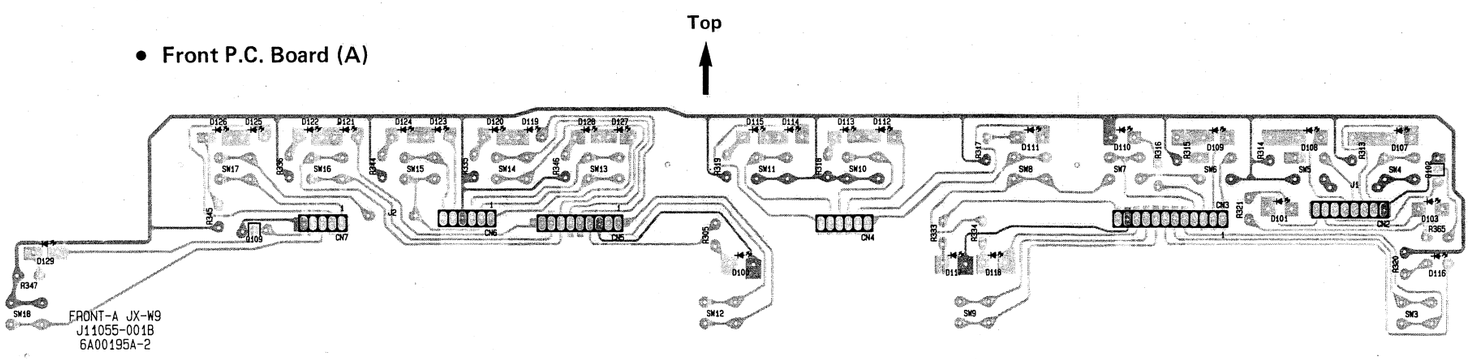
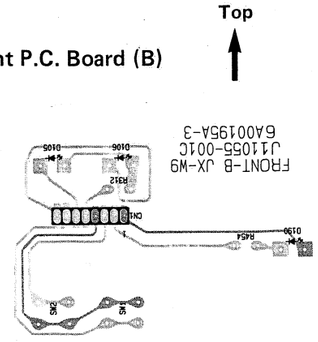
- Mode SW P.C. Board



- Power SW P.C. Board



- Front P.C. Board (A)



- Front P.C. Board (B)